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ABSTRACT

This document presents data and recommendations on graduate education in Washington State, and outlines institutional plans for achieving a graduate enrollment goal that allows the state to reach the 70th percentile nationwide by 2010. The report is divided into seven sections that address the following questions: (1) What is graduate education? (2) What principles should guide the development of graduate education? (3) What graduate programs does the state need? (4) What should be the state's plan for expansion of graduate enrollments? (5) How should the needs of Spokane be met? and (6) What financial policies will be needed to encourage graduate enrollment growth and maintain program quality? The following specific topics are addressed: the state's economic development needs; questions surrounding educational quality, access, and diversity; levels of graduate enrollments needed by the state and the 4- and 2-year institutional projects to meet these needs; and tuition policy, waivers, and financial aid. Summaries and recommendations follow each section. Appendices list members of the Graduate Education Advisory Committee, present the Graduate Enrollment Plan of the Higher Education Coordinating Board, and the state's plan for graduate enrollments listed by institution and by field. (Contains 27 references.) (GLR)

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GRADUATE EDUCATION STUDY

FINAL REPORT AND RECOMMENDATIONS

September, 1991

Higher Education Coordinating Board
917 Lakeridge Way, GV-11
Olympia, Washington 98504

HE 027 036

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GRADUATE EDUCATION STUDY

FINAL REPORT AND RECOMMENDATIONS

September, 1991

Higher Education Coordinating Board
917 Lakeridge Way, GV-11
Olympia, Washington 98504

PREFACE

This study was requested by the Higher Education Coordinating Board and conducted by Dr. Katrina Meyer, Senior Policy Associate, of the HECB staff. Comments or requests for additional copies should be addressed to Dr. Meyer at the HECB, 917 Lakeridge Way, Mail Stop GV-11, Olympia, Washington 98504.

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The author wishes to thank the members of the Graduate Education Advisory Committee and the four subcommittees formed to assist with preliminary reports in their areas of expertise: Teacher Subcommittee, State Need Subcommittee, Financial Subcommittee, and Spokane Subcommittee. The Advisory Committee operated from the study's inception, and its advice, insight, and information have been critical to the preparation of a well-reasoned final report.

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Graduate Education Study

Executive Summary and Recommendations

In April 1990, the HECB directed that a study of graduate education be undertaken, to develop a plan for achieving a graduate enrollment goal that allowed Washington state to reach the 70th percentile nationwide by 2010. A comprehensive review of each institution's graduate programs, the special conditions affecting graduate students, and the state's need for citizens with graduate degrees were but a few of the activities that supported the state plan for graduate enrollment growth.

What is graduate education?

- Graduate education requires a commitment, in terms of student time, faculty preparation, and institutional resources. It relies heavily on teaching and applying appropriate research and analytical methods. The pursuit of state-of-the-art scholarship is crucial to the graduate enterprise, and makes demands upon graduate students, faculty, and support functions (e.g., libraries).

- Graduate programs include master's and doctoral degrees, and can be further classified as "research-" or "practice-oriented." While only the UW and WSU offer the doctorate, all six public institutions offer the research- and practice-oriented master's degrees.

Why does the state need graduate education?

The state of Washington clearly needs and will greatly benefit from an expanded and vital graduate enterprise. Benefits accruing to the state include:

- A highly trained and productive workforce, whose creativity, productivity, and leadership can improve the state's competitiveness in regional, national, and international markets.

- Increasing "intellectual capital" through research and creative endeavors that push the boundaries of knowledge, solve problems, develop new theories, and forge new ways of thinking and understanding.

- The best and brightest graduate students who are recruited to the state -- and stay.

- Economic development opportunities, through the awarding of nearly $416 million in FY 1990 in grants and contracts which support 1750 Research Assistants.

- The professional development and career growth of many of the state's citizens, whose future contributions can fuel economic development and productivity gains.

- The cultural activities of graduate students who perform in plays, produce innovations in art, design new museum exhibits, compose music, and provide education to the general public.

- An enhanced "cultural diversity" in the community as students from across the nation and world come to Washington State to learn and create opportunities for Washington students to learn about other cultures, languages, and religions.

- The personal growth of individuals who pursue graduate education to be intellectually challenged, learn new disciplines, or broaden their understanding of the world.

- A strengthened higher educational system, which draws upon graduate students to improve undergraduate instruction and stimulate faculty, and contributes to the institution's prestige and likelihood of receiving external funds.

For all of these reasons, and for the benefits which accrue to the individual and his/her community, graduate education can and should make an important contribution to Washington State over the 20-year period from 1990 to 2010.

What general principles should guide development of graduate education?

- Four general principles should guide the development of graduate education: Quality, Access, Diversity, and Consideration of the Independent Institutions.

- Maintaining and enhancing quality will require recruiting, developing, and retaining quality faculty; finding and supporting quality graduate students; and ensuring quality educational programs.

- Increasing access to graduate programs will require that most students be brought to the main or branch campuses, where the necessary resources are available to provide a quality education.

- Applicants to graduate programs should be evaluated on a variety of factors, to include, but not be limited to, undergraduate GPA, GRE scores, letters of recommendation, personal statements, or interviews.

- Telecommunications should provide equivalent quality to in-person faculty-student interaction, but might not be appropriate for all programs. Its use for doctoral programs should be restricted.

- Efforts to increase the diversity of graduate students should focus on improving the educational pipeline, increased financial support, support services, and an environment of commitment among all facets of the institution.

- The vitality of independent institutions should be of concern to the state. Public and independent institutions should regularly share program planning information and programs offered by public institutions should be assessed for their possible impact on programs at independent institutions.

What graduate programs does the state need?

- The relationship between occupations and graduate education is not consistent. For some occupations, graduate training is required for career entry (e.g., law, medicine, university faculty). For other occupations, graduate education is a means to professional development (e.g., engineering, education). For still other occupations, changes in professional standards, new technologies, or the expansion of knowledge requires increasing educational levels.

- Relying on other states to provide Washington with graduate-prepared workers has two drawbacks: it disadvantages Washington businesses, who rely on graduate programs to upgrade workers, and it disadvantages Washington citizens, who cannot pursue graduate education to improve their skills or enter the professions.

- The study reviewed a variety of existing occupational projections and factors impacting occupational change in Washington State.

  - The Washington State Employment Security Department's (1989) Occupational Projections: 1988-1993 was used as a base for planning.

  - Needs assessments or projections prepared by state agencies and state professional associations were reviewed.

  - Discrete needs assessments were performed where existing information was inadequate (e.g., master's degrees for teachers, faculty retirements).

  - Changes in educational requirements were considered.

  - For regional differences, the ESD projections by county, information from local area Economic Development Councils, and branch campus needs assessments were reviewed.

- Most degree programs should increase their graduate enrollments between 1% and 5% per year, to accommodate occupational growth for new employees and professional development needs of existing employees. Table 1 summarizes this information.

- Some occupations were deemed "areas of special need." These areas are suffering temporary problems, and thus this designation should be reviewed periodically.

  - The nursing shortage requires additional enrollments in graduate programs.

  - Support for economic development initiatives requires enhanced enrollments in engineering, computer science, and science and technical programs.

- Due to increased faculty retirements and the need for additional faculty to handle enrollment growth, enrollments should be increased in a) master's degree programs which prepare community college faculty and b) doctoral-track (master's and Ph.D.) programs in a variety of disciplines.

- A master's degree program of interest to teachers that has great potential for improving K-12 education was the content-area master's. Universities should pursue the development of these programs, perhaps delivered over three summers.

- The HECB conducted a survey of the state's teachers and those institutions offering master's degrees for teachers to ascertain the supply and demand for master's degree programs.

  - The survey of teachers estimated that 69% (28,804) did not have master's degrees, 23% (9,665) expect to enroll in a master's degree program, but only 4% (1,669) actually needed the master's degree to receive continuing certification.

  - The survey of institutions providing graduate education for teachers found that the institutions had increased their enrollments in master's degrees for teachers from 1988-89 to 1990-91 by approximately 40%.

  - It was estimated that all teachers interested in enrolling in a master's degree program plus new teachers would be able to enroll in a master's program by 2000.

- Future planning for graduate programs should be done on a regular, 4- or 6-year cycle, to update the occupational projections in this study and to respond to unforeseen changes in the economy or local communities.

- A statewide needs assessment of the general public's interest in graduate education would assist HECB planning and evaluation of program proposals.

- Few graduate degree programs can be offered at equivalent quality in rural, isolated communities, especially if offered on a self-sustaining basis. Thus, means should be found to allow students to pursue graduate education on the main campuses: sabbaticals, employer relationships, or summer-only programs.

Table 1
Occupational Projections, Growth Category, and Areas of Special Need

Occupation	Growth Category	20-Year % Growth	Areas of Special Need
Management	Modest	20%-100%	--
Engineering	Modest	20%-100%	High
Scientific	Modest	20%-100%	High
Social Science	Modest	20%-100%	--
Lawyers	No Growth	0%	--
K-12 Teachers	Modest/Moderate	See Notes	High
Higher Ed. Faculty	Modest until 2000	10%-50%	High
	Moderate after 2000	60%-100%	
Health			
Physicians/Dentists	Modest	20%-100%	--
Veterinarians	No Growth	0%	--
Physical Therapists	Modest	20%-100%	--
Pharmacists	Modest	20%-100%	--
Nurses	Moderate	100%-200%	High
Fine Arts	Modest	20%-100%	--

What should be the state's plan for expansion of graduate enrollments?

- The public and independent institutions offering graduate programs in the state were asked to provide plans for enrollment growth, by discipline, for 1990, 1995, 2000, and 2010.
- Each institution undertook planning in a different manner, appropriate to its internal review structure. The input of deans, directors, and faculty was expressly sought.
- Each institution's plan is different, capitalizing upon institutional strengths, market forces, and institutional role and mission.
- Estimates of enrollment growth were made under the assumption that sufficient funding would be available to support graduate students, library enhancements, equipment, and capital facilities.
- Table 2 summarizes the total enrollment figures planned for by the public and independent institutions. The totals would not allow the state to reach the 70th percentile in graduate enrollments, and thus the state plan modifies the institutions' plans.

Table 2
Total Prospective Graduate Enrollments – Publics and Independents

	1990	1995	2000	2010	20-Year Growth #	20-Year Growth %
State-Funded (Publics) Enrollments	14,127	18,552	21,975	25,327	11,200	79.3%
Independent Institutions Enrollments	6851	8803	9763	10,793	3942	57.5%
TOTALS	20,978	27,355	31,738	36,120	15,142	72.2.%

- The state plan (see Table 3) for graduate enrollment growth is a system approach to graduate education, with the main campuses of the two doctoral institutions focusing on doctoral students, and their branch campuses and the comprehensive institutions focusing on master's programs.

- The comprehensive institutions should focus on developing and maintaining high-quality research- and practice-oriented master's degree programs.

Table 3
State Plan for Graduate Enrollment Growth

	1990	1995	2000	2010	20-Year Growth #	20-Year Growth %
UW Seattle	8970	9500	10,000	11,000	2030	22.6%
Evening	--	500	1000	1500	1500	--
Bothell	--	200	600	800	800	--
Tacoma	--	300	700	1000	1000	--
Total UW	*8970*	*10,500*	*12,300*	*14,300*	*5330*	*59.4%*
WSU Pullman	2225	3000	3500	4000	1775	79.8%
Southwest	124	400	600	1000	876	706.5%
Tri-Cities	377	600	700	1000	623	165.3%
Spokane	81	400	600	1000	919	1134.6%
Total WSU	*2807*	*4400*	*5400*	*7000*	*4193*	*149.4%*
CWU	364	600	700	1000	636	174.7%
EWU	1212	1600	2100	2600	1388	114.5%
TESC	202	320	500	600	398	197.0%
WWU	572	1000	1200	1300	728	127.3%
Total Publics	14,127	18,420	22,200	26,800	12,673	89.7%
Independents	6800	8800	9800	10,800	4000	58.8%
Post-Baccal. (Est.)	2000	2125	2250	2500	500	25.0%
TOTALS	**22,927**	**29,345**	**34,250**	**40,100**	**17,173**	**74.9%**

- Table 4 presents the state plan, by field, for graduate enrollments. This plan increases enrollments in areas of special need, as indicated in Table 1, and stabilizes enrollments in areas where occupational need is not projected to experience growth.

Table 4
State Plan for Enrollment Growth by Field

	1990	1995	2000	10-Year Change #
Arts & Sciences				
Arts	445	520	590	145
Humanities	888	1070	1180	292
Social Sciences	1500	2075	2470	970
Sciences	1605	2310	2825	1220
Professional Fields				
Business & Mgt.	844	1330	1840	996
Education	1934	3170	4055	2121
Public Adm. & Plan.	417	450	515	98
Social Work	454	490	530	76
Library Sci.	176	185	195	19
Legal Studies	36	35	35	-1
Family/Other	52	55	100	48
Architecture	219	280	290	71
Engin. & Tech.	1544	2015	2540	996
Forestry	177	185	195	18
Fisheries	311	320	330	19
Agriculture	155	165	210	55
Nursing	343	445	580	237
Allied Health	262	460	635	373
Public Health	302	345	385	83
Medicine	233	290	345	112
Dentistry	59	60	60	1
Pharm. Sci.	103	115	125	22
Vet. Sci.	67	90	105	38
Interdisciplinary	219	265	370	151
Other (Unclassified)	153	80	80	-73
First Professional				
J.D.	463	450	450	-13
M.D.	644	645	645	1
D.D.S.	204	200	200	-4
D.V.M.	305	305	305	0
Pharm.D.	13	15	15	2
TOTALS	14,127	18,420	22,200	8073

- An institution may allocate a small portion of its state-funded graduate enrollments to support quality off-campus programs.

- Increased graduate enrollments should be supported at the full cost-per-FTE rate.

- Of continuing concern nationwide is the projected undersupply of new faculty to cover increasing faculty retirements and enrollment increases. A survey of the state's public institutions and community colleges was conducted by the HECB to ascertain the extent of the problem in Washington State. Table 5 estimates the additional cumulative faculty needed by Washington State's public 4-year and community colleges.

Table 5

Estimates of Cumulative Faculty Needed to Accommodate Enrollment Growth and Projected Retirements for Public Four-Year Institutions and Community Colleges

	Due to Retirements		Due to Enrollment Growth		Cumulative
	4-Year	CCs	4-Year	CCs	Total
By 1995	564	253	615	99	1531
By 2000	1197	609	1187	318	3311
By 2005	1908	1087	1841	541	5377
By 2010	2767	1577	2939	807	8090

- A survey on recent faculty hires conducted by the HECB found that between 10% to 47% of new faculty had graduate degrees from Washington institutions. It is highly likely that as graduate enrollments increase in master's degree programs, additional graduates will stay to teach within the state's community college system. Ph.D. recipients will be able to join the faculty of the state's doctoral and comprehensive institutions.

How should the needs of Spokane be met?

- Collaboration between and among higher education institutions is expected.

- Duplication of programs is allowable, if warranted by the needs of Spokane and documented for review and approval by the HECB.

- Degree programs which might serve as a catalyst for economic development should be a part of a coordinated economic development plan for the area and be needed on a regional or statewide basis.

- The independent institutions should be involved in program planning and delivery for Spokane.

- Program Responsibilities for Eastern Washington University:

  - Most professional programs should be offered in Spokane.

  - Research-oriented master's programs should be located at Cheney.

  - Practice-oriented master's programs should be located based on accessibility and resources.

- Program Responsibilities for Washington State University in Spokane:

  - Practice-oriented master's programs where collaboration between or among institutions is appropriate or where sufficient need for duplication can be documented.

  - Practice-oriented master's programs in science, technical, and applied technology areas, areas where WSU has sole statewide authority or no program duplication will exist.

  - Research-oriented master's programs in the sciences should be planned for the years 2000 to 2010.

- WSU-Spokane should plan to serve a regional student body who relocate to Spokane if the graduate program is unique to Spokane.

- As directed by the 1991 Legislature, the Joint Center for Higher Education is responsible for coordination of higher education programs and activities in Spokane, including the Spokane Intercollegiate Research and Technology Institute (SIRTI), and a master plan for the Spokane Higher Education Park.

- Appendix C to the Master Plan (HECB, 1987) should be modified and approved by the HECB to incorporate program-level assignment of responsibility. The intent should not be to identify every possible program, and the list should be revisited as needs change.

- Final approval of all degree programs, SIRTI, and the master plan is the responsibility of the HECB, based on recommendations forwarded by the Joint Center.

What financial policies will be needed to encourage graduate enrollment growth and maintain program quality?

- It is possible to maximize the impact of state resources by tailoring graduate student support to meet the different -- and changing -- needs of different disciplines, master's or doctoral-track programs, recruitment demands, campus locations, and institutional missions.

- Table 6 illustrates the differences in financial need for students at a doctoral vs. comprehensive institution, and between doctoral and master's students. Master's students are more dependent on loans and employment, doctoral students must rely on university employment to make it through several years of full-time study.

Table 6
Primary and Secondary Sources of Funding

Source	University of Washington #	University of Washington %	Western Washington University #	Western Washington University %
Primary				
Own/Family	92	30	79	29
University*	158	52	74	24
Federal**	36	12	22	9
Non-Federal***	1	0	6	2
Student Loans	4	1	34	11
Other/Employer	16	5	67	25
TOTAL	307	100	282	100
Secondary				
Own/Family	90	34	109	54
University*	112	42	22	10
Federal**	34	13	15	7
Non-Federal***	5	2	6	1
Student Loans	23	9	39	17
Other/Employer	3	0	24	10
TOTAL	267	100	215	100

** Includes TA, RA, fellowship, work-study.*
*** Includes NIH, HHS, NSF, FLAS, Veteran's, other federal, but not RA positions (which are predominantly funded by federal and other grants).*
**** Includes private/foundation fellowship.*

Graduate Students

- Resident students will increase their participation in graduate education through a variety of means: increased enrollments at the main campuses, branch campuses, and off-campus programs.

- Non-resident students bring a variety of different backgrounds to the classroom, adding perspectives from another culture to the study of a discipline. Table 7 displays the proportion of non-resident (other U.S. citizens and international) students for Fall 1989.

Table 7
Fall 1989 Graduate and Professional Student Headcount Enrollment, by Residency Status

	Washington Residents		Other US Residents		Non-Resident/ Foreign		Total
	#	%	#	%	#	%	#
UW	5256	60.8	2250	26.0	1144	13.2	8650
WSU	1266	53.9	630	26.8	453	19.3	2349
CWU	298	89.5	21	6.3	14	4.2	333
EWU	509	80.5	102	16.1	21	3.3	632
TESC	145	91.2	12	7.5	2	1.3	159
WWU	457	81.8	56	10.0	46	8.2	559
TOTALS	7931	62.5	3071	24.2	1680	13.2	12,682

- The state should see continued growth in the number of adult graduate students, married students with dependent children, and part-time students.

- The state institutions, in conjunction with the HECB, should initiate planning for the provision of improved health care benefits, child care, and housing for graduate students.

Graduate Tuition

- Graduate tuition has risen to comparatively high levels. Table 8 compares resident and non-resident rates to the public institutions' peer groups, and in all cases, the Washington tuition rate is above the peer group average, ranging from 6.1% to 77.4% above average.

Table 8
Washington 1990-91 Graduate Tuition vs. Institutions' Peer Groups

	Rate	Peer Ave.	% of Peer Ave.	Rank Among Peers
University of Washington				
Resident Graduate	$3,033	$2,827	+7.3	9
Non-resident Grad.	$7,578	$7,139	+6.1	12
Washington State University				
Resident Graduate	$3,033	$2,506	+21.0	7
Non-resident Grad.	$7,578	$5,908	+28.3	5
Comprehensives/The Evergreen State College				
Resident Graduate	$2,604	$1,885	+38.1	7
Non-resident Grad.	$7,899	$4,452	+77.4	1

- The question of what tuition policies would be equitable to students and the state remains unanswered. The HECB and the institutions should collaborate in an effort to document the relationship graduate tuition has on graduate students.

- Part-time tuition should be calculated on a proportional per-credit basis assuming 10 credits as a full-time graduate load.

- The perception that summer tuition is higher than academic year rates was not borne out by the comparison in Table 9. It does not appear that summer tuition alone is a deterrent to graduate enrollment.

Table 9
Graduate Tuition and Fee Rates, Summer 1990 vs. Academic Year 1989-90

	Summer Rate	Academic Year Rate
Univ. of Washington		
Part-time (2-credit minimum)	$187	variable
Full-time (6+ credits)	$647	$867
Washington State Univ.		
Per (semester) credit hour	$125	$142
Full-time (10+ credits)	$1250	$1419
Central Washington Univ.		
Per credit hour	$70	$82
Full-time (10+ credits)	$700	$819
Eastern Washington Univ.		
Per credit hour	$71	$82
Full-time (10+ credits)	$710	$819
Western Washington Univ.*		
Per credit hour	$100	$82
Full-time (10+ credits)	$1000	$819
The Evergreen State College		
Per credit hour	$81.90	$81.90
Full-time (10+ credits)	$819	$819

** Western has changed its summer-term tuition to be proportional to academic year rates.*

Tuition Waivers

- Only half of the state's 35 tuition waiver programs are available to graduate students; the waiver to Graduate Service Appointees (GSAs) comprises 27.3% of the total dollar amount waived.

- It is important to reconceptualize the tuition waiver granted to state-funded GSAs as in lieu of compensation. In 1984, the Legislature lowered the amount of the stipend by the amount of the tuition waiver; this lowered income taxes for the student and ensured that waivers would keep pace with increases in tuition. Were the waiver terminated, the stipend rates would need to be increased by the tuition amount to allow graduate students to pay their tuition.

The Future Faculty

- Teaching Assistants (TAs) are the state's and nation's future faculty. They serve as apprentice faculty, improving their teaching skills, learning how best to advise students, and learning the obligations of faculty. Institutions have instituted programs to assist TAs in their teaching duties.

- TAs represent a cost savings to the institution and state. One TA typically teaches the equivalent of one-half to two-thirds of one full-time faculty person, at a cost of $10,000 to $15,000 (stipend + tuition waiver, resident and non-resident rates, respectively) compared to $30,000 to $40,000 in salary alone for one faculty.

- Research Assistants (RAs) are also perfecting their future professional skills as faculty members, learning research techniques, assisting faculty to compete for external funds, and training other students in research methods.

- RAs are predominantly funded by external sources, and their tuition waivers are normally built into grant budgets.

Financial Aid

- Table 10 reveals that financial aid for graduate students has concentrated on loans, which has increased the debt burden of graduating students. In the future, financial aid policies should attempt to assist graduate students with non-repayable aid, such as assistants, fellowships, grants, and scholarships.

Table 10
Academic Year 1989-90 Aid to Graduate Students

	Scholarships	Work/Study Funds State	Federal	2 1/2%	Loans	Total
UW	$45,572	$295,169	$381,538	$543,686	$7,159,988	$8,425,953
WSU	$20,700	$579,948	$361,666	$106,075	$2,905,735	$3,974,124
CWU	--	$87,024	$28,814	$12,447	$312,784	$ 441,069
EWU	$4,742	$168,836	$23,512	$24,517	$456,784	$ 678,391
TESC	--	$6,848	--	--	$137,199	$ 144,047
WWU	$1,824	$157,153	--	$30,626	$397,129	$ 586,732
Privates	$59,281	$1,125,279	$274,044	--	$8,416,535	$9,875,139
TOTALS	$132,119	$2,420,257	$1,069,574	$717,351	$19,786,154	$24,125,455
% of Total $	**0.6%**	**10.0%**	**4.4%**	**3.0%**	**82.0%**	**100%**

NOTE: (1) Known to be awarded to students with financial need. Therefore, these figures are not to be construed as complete or comprehensive. (2) Federal loan programs include SEOG IY/CY, NDSL, Health Loan, Nursing Loan, HEAL/FISL/GSL.

- The state should fund the Washington State Graduate Fellowship Program at the rate of $3 million per biennium, to establish 120 permanent fellowships at the public institutions (see Table 11).

Table 11
Proposed Appropriation to Graduate Fellowship Program, per Biennium

Institution	Allocated Fellowships	Dollars
UW	72	$1,800,000
WSU	36	$ 900,000
CWU	3	$ 75,000
EWU	3	$ 75,000
TESC	3	$ 75,000
WWU	3	$ 75,000
TOTALS	120	$3,000,000

- The Minority Graduate Fellowship Program would fund a small number of minority students who wish to pursue a teaching career at a community college or university. Such a program might contribute to the number of minority role models available to students in Washington higher education institutions.

- The State Need Grant program should include needy graduate students, who may then choose the graduate program they desire at either a public or independent university.

- The HECB, in consultation with the institutions, should initiate planning for additional capital capacity to handle graduate enrollment growth at the main campuses.

- Institutions should implement ways to improve student retention, decrease time-to-degree, enhance faculty productivity, support graduate students, and raise external funds or reallocate internal funds to support many improvements.

- Total cost to the state for the state plan appears in Table 12 and totals less than $15 million per biennium.

Table 12
Total State Expenditures for Graduate Education Plan
($ in Thousands)

	Biennial Totals		
	93-95	95-97	97-99
Net Cost of Enrollment Growth	11,671.3	10,817.3	9,924.9
Graduate Fellowship Program	3,000.0	3,000.0	3,000.0
Minority Graduate Fellowship Program	1,020.0	1,100.9	1,320.4
TOTAL COST	15,691.3	14,918.2	14,245.3

A Final Word

Planning for graduate enrollment growth has driven home the crucial importance of improving the educational pipeline. Future graduate students come from the K-12 system and undergraduate programs, and the future success of graduate education rests to a large extent on the shoulders of the educators who precede it. Students must arrive well-prepared academically, they must desire to engage in the demands of graduate study, and they need the curiosity and self-discipline to support them through several years of additional study.

The public has a right to expect that graduate education can make a substantial contribution to the state. However, the graduate enterprise will depend upon the efforts of K-12 teachers and students, higher education faculty and administrators, and the funding decisions made by the Washington State Legislature.

Graduate Education Study

FINAL REPORT AND RECOMMENDATIONS

Background

The impetus for the Graduate Education Study came from the planning undertaken to prepare the statewide enrollment plan, Design for the 21st Century (HECB, 1990). In that document, the Higher Education Coordinating Board adopted a goal for the state of reaching the 70th percentile in graduate and professional enrollment by the year 2010. However, questions remained on how to reach that goal, what programs would need to grow, what the expansion would mean in terms of financial support, and what policies should guide the enrollment growth. Finding answers to these questions was made difficult by the complexity of graduate education -- the students, the degree programs, faculty and institutional strengths -- and the dynamics which affect its growth and quality.

At its April 1990 meeting, the HECB approved a plan for a comprehensive study of graduate education in the state of Washington. The study was conceived to answer a number of questions, which comprise the backbone of this report. A Graduate Education Advisory Committee was formed to assist HECB staff in understanding issues and preparing a complete plan. This Committee operated from the study's inception, and its advice, insight, and information have been critical to the preparation of a well-reasoned final report. Since several of the questions entailed specific or specialized knowledge, four subcommittees were also formed to assist with preliminary reports in their areas of expertise. These subcommittees operated through the Fall of 1990, and their reports were reviewed and modified to develop an integrated statewide plan for graduate enrollment growth. While it has been important and immensely helpful to consult with a variety of experts during the planning process, final responsibility for the plan rests with HECB staff.

I. What is graduate education?

It is unfortunate that we use one term for graduate education, because this one term implies a unity that simply is not the case. Graduate education is not homogenous, but a collection of different programs which serve a variety of different occupations, goals, and students. Faculty who teach in graduate programs are assumed to have additional skills and experience, but those skills and experiences may be quite different from one program to another. Programs require different resources to be excellent, with some disciplines dependent upon libraries more than laboratories and others needing patients more than computers. It will be important through the following discussion to recall these differences to prepare a reasonable plan based upon them.

Graduate Education -- Generally, graduate education is more than post-baccalaureate education in content, depth, and structure. Post-baccalaureate activity may be simply credit-taking beyond the bachelor's degree. In contrast, a graduate program is a structured academic program which focuses learning in a content area or interdisciplinary study, requires protracted learning in some depth, and emphasizes the understanding and application of appropriate research and analytical methods. Graduate education is distinguished by its important role in training students in the research and scholarship norms of the discipline or profession, and the stress placed upon the contributions such research makes for society as a whole. For purposes of this report, post-baccalaureate professional education is also included in the definition of graduate education.

Master's Degree -- A master's degree involves advanced work within a discipline beyond the baccalaureate, including instruction in the conduct and/or evaluation of current research. The master's degree has become highly diversified and reflects a variety of functions, depending on the profession and discipline. For example, the master's degree may be the preferred entry-level degree for a profession, the terminal degree for other occupations (e.g., community college faculty), or it may be preparatory for the doctoral degree. It emphasizes the acquisition of disciplinary knowledge, research skills, or clinical skills for a profession and increasingly includes interdisciplinary or cross-disciplinary study. (See Glazer, 1986, for a review.)

Doctoral Degree -- Doctoral programs require advanced preparation beyond the master's degree, including the acquisition of disciplinary expertise and extensive preparation and experience in research. The conception, conduct, explanation, and defense of a research project is essential to the doctoral program which emphasizes the student's responsibility to make an original contribution to the extant body of knowledge. In some clinical and professional fields, the doctorate prepares the clinician in the use and evaluation of current research, to minister to the needs of a clinical population using the highest professional standards, and to conduct research within the clinical setting. The doctorate is essential preparation for the professorate and should include experience in teaching, advising students, conducting research, and socialization to the role of college professor.

Program Types -- For purposes of this report, graduate programs are broken down into two types, "research-oriented" and "practice-oriented." The "research" track refers to that combination of master's and doctoral degree programs which ultimately prepares the Ph.D. recipient to conduct original research for industry or at a university, and to instruct students in research methods and academic content appropriate to the discipline. The "practice" track refers to master's and doctoral degree programs which prepare the practitioner in the content, ethics, and current research to serve within a profession. The distinction between "research" and "practice" track is most helpful at the master's level.

Fields -- There are a variety of organizing schemas for discussing academic disciplines, but this report uses a fairly simple one to guide the planning process. Disciplines have been grouped into four broad content fields and four additional professional fields which draw upon one or more of the content fields for their disciplinary basis. One advantage to grouping programs is to accentuate differences in resources needed, student populations, and institutional missions.

Arts & Sciences

Arts	Creative disciplines such as art, dance, music, and theater which prepare performers or practicing artists, or art historians or theoreticians.
Humanities	Traditional liberal arts disciplines such as English, history, foreign languages, etc.
Social Sciences	Study of people and their structures using the frameworks of psychology, economics, sociology, political science, etc.
Sciences	A grouping of mathematics, the natural/physical/biological sciences, and computer science.

Professional Fields

Social science-based: Law, education, business, library science, public administration, etc. -- professions requiring extensive training in one or more *social science* disciplines, plus preparation and practice in technical and/or clinical skills.

Science-based: Engineering, architecture, forestry, fisheries, etc. -- professions requiring extensive training in one or more *science* disciplines, plus preparation in technical and/or clinical skills.

Health sciences: Health-related occupations (e.g., nursing, allied health, speech pathology) which require heavy preparation in the *sciences* and, in some cases, the *social sciences, and* which may require lengthy training in technical and/or clinical skills (excluding first professional degrees).

First professional: Doctoral programs in law (J.D.) and health (M.D., D.D.S., D.V.M., Pharm.D.) which require extensive post-baccalaureate preparation and are heavily regulated by external groups, e.g., accrediting agencies or professional associations.

Scholarship -- If graduate education has one consistent and identifying characteristic, it is the involvement of students and faculty in the creation and development of knowledge. Faculty are expected to make an original contribution to their discipline, which may take different forms with different disciplines. In science, laboratory

research may be the norm, though invaluable contributions may also be made through computer modeling or new theoretical postulations. In the arts, the contribution may take the form of an artistic creation, performance, new aesthetic theory, or the development of new artistic media or technologies. In many professional or applied fields, the contribution may be improvements in practice which fall under the rubric of "public service." These contributions are more accurately called "scholarship," or the products of scholars whose learning and expertise equip them to offer new insights, new connections, and new solutions to their discipline. Boyer (1990) has argued eloquently for a resurgence of the term "scholarship," to use this "honorable . . . more capacious" term for what faculty do (and graduate students are taught). He describes four types of scholarship as equally worthwhile and beneficial endeavors: *discovery* -- contributing new knowledge, *integration* -- interpreting existing knowledge, *application* -- using and improving upon knowledge, and *teaching* -- transmitting, transforming, and extending knowledge.

Graduate Faculty -- Graduate programs are supervised by faculty which are often designated as "graduate faculty." The distinction is an important one. Graduate faculty are expected to maintain an active research program or record of scholarship. They are chosen for their understanding and experience in directing the research of graduate students, assisting them to design, conduct, analyze, write, and defend an original research project which must delve into some aspect of the discipline (or multi-disciplines) in substantial depth and detail. They are also responsible for teaching graduate courses and maintaining the quality of the program and other institutional standards for the granting of graduate degrees.

Institutional Role and Mission -- One of the HECB's statutory duties is to approve role and mission statements for the public institutions. This process has not been completed as of this date, but some sense of mission is clearly evident in the statutes establishing the universities and throughout RCW 28B. Two doctoral institutions -- the University of Washington and Washington State University -- may grant doctoral degrees. Four comprehensive institutions -- Central, Eastern, and Western Washington Universities and The Evergreen State College -- may grant master's degrees in applied areas. Other than the authority to grant doctoral degrees, there is not as much to distinguish the universities at the master's level as one might believe. All six institutions can, or are, offering master's degrees which are "research-oriented" as well as "practice-oriented," though the proportion of effort (e.g., in number of students) differs. Apart from these general mission considerations, however, each university has developed expertise in areas or in methods which make it distinctive and enhance its reputation.

Off, Branch, and Main Campus -- The main campus is where the university is headquartered, and where the majority of its academic support resources are housed. Branch campuses are in five locations only, and are specifically intended to serve the educational needs (upper-division and applied master's programs) of working, placebound adults. The University of Washington operates branch campuses in

Bothell/Woodinville and Tacoma, and Washington State University operates branches in Spokane, Tri-Cities, and Southwest Washington. At this writing, there is only one off-campus center, operated by Central Washington University in Yakima. However, several public universities offer off-campus degree programs in rural or otherwise underserved areas of the state. HECB policies govern the approval of degree programs offered at all sites.

These brief and general definitions introduce the reader to differences in graduate education which will be useful to understanding the issues which follow. Additional implications of some of these terms will be addressed in later sections.

What is graduate education?

Summary

- Graduate programs exist at all of the state's public 4-year institutions. Doctoral degrees are offered only at two institutions -- the UW and WSU. The three comprehensive institutions (CWU, EWU, and WWU) and TESC offer master's degrees in a variety of fields.

- Graduate education can be loosely classified as master's and doctoral programs which are "research-oriented" and those which are "practice-oriented."

- Whether research- or practice-oriented, all graduate programs are distinguished by a crucial and substantial involvement in scholarship, for both faculty and students.

- "Scholarship" is a more accurate term than research to describe the contributions made by faculty and graduate students to new knowledge, better integration of existing knowledge, new applications, and better teaching.

II. Why does the state need graduate education?

Graduate students, and the graduate enterprise, are essential for the health and vitality of the state. Along with the rest of higher education, graduate education contributes to the goals set forth for the state's higher education system in the Master Plan for Higher Education (HECB, 1987):

Cultural Enrichment
- Appreciate shared values
- Appreciate different cultures and creeds
- Enrich community culture

Social Leadership
- Promote equal opportunity for all
- Provide equitable access
- Encourage full participation

Economic Development
- Provide the human capital
- Offer a broad education
- Bind a lasting partnership between academia and industry

SOURCE: Master Plan (HECB, 1987).

In addition to these more general benefits, graduate education contributes in many specialized ways to the state's welfare.

Training an Educated Workforce

Graduate education's primary contribution to the state is the production of highly-trained and creative graduates who can make their own unique contributions to the state's economy. The changing economy of the state parallels changes nationwide. Washington is seeing more companies and employment in high-technology fields -- electronics, computers, engineering -- and the demand for more highly educated teachers for the K-12 system. Health fields are requiring longer and more technical preparations, as are many professions which must continually upgrade their skills to keep up with changing conditions. The internationalization of businesses and especially the economy of the state of Washington requires training in languages and cultures, other countries' business practices and international markets. Graduate education is crucial to supporting these on-going changes, allowing individuals to stay current, enhance skills, change careers, and improve their profession.

The graduate enterprise is also essential to training the future faculty at the state's community colleges, comprehensive universities, and universities across the nation. And it will be the future faculty, trained in graduate programs today, who will contribute their time and expertise, teach the next generation, and develop new knowledge.

Graduate education is an investment in professions and in the professionals who in turn serve the state and its citizens. It trains individuals going into the profession and retrains those who need professional development in mid-career. Graduate students go on to provide vital social and health services, to improve K-12 education, and to serve the state in government positions.

Graduate education contributes an educated citizenry to the state. These individuals take leadership positions, work for social and political causes, and enter the public debate as informed, and informing, citizens. Universities offer public educational programs, lectures and symposia, even educational television to their communities.

Increasing the State's Intellectual Capital

Graduate education goes beyond the preparation of an educated citizenry to push the frontiers of knowledge and add to the intellectual capital of society. By pursuing basic and applied research in a variety of disciplines, graduate students and their professors make contributions which fuel the economy, solve health and social problems, and lay the groundwork for further scientific and technological developments. Beyond these instrumental outcomes of their research, graduate students and faculty develop new ideas, test emerging concepts and theories, and create new ways of seeing and thinking. They push society to expand the limits of present understanding, to challenge the status quo, to forge new ways of comprehending the human and natural world, and to think ever more critically and creatively. They develop new solutions to old problems, and foresee future problems in present realities. They work sometimes in obscurity, but the results of their efforts benefit generations to come.

Graduate education can function as a recruiting device to bring the best and brightest to Washington State. Approximately 35% to 40% of the doctoral students graduating from WSU and the UW respectively stay in Washington, a figure that is high in comparison to other states. Washington can, if it chooses, capitalize upon its national prominence as a destination state to draw capable individuals here and to keep them. At the same time, expanded opportunities for graduate education should also ensure that the best and brightest of Washington's residents are able to pursue their graduate programs within one of Washington's institutions, if they choose to do so. Enhanced support of graduate education is an effective recruitment and retention tool for Washington's businesses and policymakers.

Enhancing Economic Development

The advanced skills, knowledge, and creativity brought to the economy by individuals with graduate training can translate into increased productivity and competitiveness. Graduate education can play a vital role in creating the skilled and creative labor force which will individually and collectively contribute to Washington's changing state and local economies. Individuals involved in the graduate enterprise create new products, new systems, and the latest research to fuel economic growth.

For example, many graduate students assist in the funded research activities of their professors. Approximately 1750 Research Assistants (RAs) are supported by external funds in the state. RAs are essential to the success of the universities' efforts to gain funding for state-of-the-art research, which brought nearly $416 million into the state in FY 1990.

Table 1
Grants and Contracts, FY1990

	Dollars Awarded
University of Washington	$345,880,720
Washington State University	$54,062,552
Central Washington University	$1,123,033
Eastern Washington University	$3,482,533
The Evergreen State College	$3,800,000
Western Washington University	$6,500,000
Independent Institutions	$1,000,000
TOTAL	$415,848,843

The economic spin-off to the local economy from the graduate enterprise includes such secondary and tertiary effects as monies spent in local businesses by graduate students and other university employees. Research and other grant-funded efforts create employment to perform the research, and demands on businesses in the local community to supply materials, etc. This "multiplier effect," which higher education as a whole has on local economies, has been estimated to be as high as 10 times an institutional budget.

Non-state research funds, made possible through the efforts of faculty and their graduate students, also fuel technology transfer. At the University of Washington, for example, the pool of active inventions has increased from 137 in 1985 to 332 in 1989. While not all inventions pay off in large amounts, some percentage do create income; royalty and license fee incomes at the UW during the same time period rose from $76,000 to $1,050,000 per year. The Office of Technology Transfer at the UW has also actively pursued and supported research agreements between UW faculty and industry, with the

number of such partnerships increasing from 379 in 1985 to 550 in 1989. It is difficult to assess the effect this activity has on the state's economy; while it may be negligible at the outset, it has the potential to grow to substantial proportions over the long term.

Not enough work has been done to estimate a graduate student's future contributions to the state's tax revenues. Clearly, however, the majority of graduate students pay back any state investment made in their education through many years of contributing revenue to the state. Their contributions include increased federal taxes paid, state and local taxes, and the greater purchasing power made possible through higher salaries.

Providing Personal and Career Growth

On the personal level, graduate education offers the individual an opportunity to develop intellectual skills and personal interests. The individual may also pursue a graduate degree to gain access to professional careers, through which he or she can serve society or fulfill personal ambitions. The graduate degree in many fields is essential to career advancement; at the least it allows the employee to improve or develop skills which can, in turn, contribute to his/her business or profession, and sense of personal accomplishment.

Graduate education can contribute to greater equity, opening doors to professions and enabling individuals to make unique contributions. At present, the barriers to attendance of qualified individuals are many, and inequities in participation in graduate education can be found based on geography, race, gender, and income. Increased access, financial aid, and recruitment/retention policies will help equalize the benefits of graduate education for many groups and allow each citizen to achieve his or her full potential.

Providing Cultural Opportunities

Higher education contributes to the cultural activities of the community. In these activities, it is difficult to separate the involvement of undergraduate and graduate students. However, graduate students, through their educational programs or as part of their creative scholarship, contribute to the ability of the institution to provide theatrical performances for the community, to maintain historical museums and art collections, and to create new music, art forms, and aesthetic standards. The production of concerts, plays, and art exhibits comprises an important -- but largely unrecognized -- cultural role for graduate education in the community.

Graduate education can also make a significant contribution to the "cultural diversity" of the state. Through its recruitment of students from diverse countries and

cultures, other students and local communities can enjoy the benefits of learning about other religions, cultures, languages, and histories. This sharing can go a long way toward lessening the misunderstanding and tensions between cultures, but it can also lay the groundwork for economic development efforts that allow Washington business to compete in international markets. In this global age, international graduate students, faculty, and studies form a critical bridge between their society and our own, and between the present and the future.

Strengthening Higher Education

Graduate programs also benefit institutions in a variety of ways. The presence of a graduate program can enrich the undergraduate experience, as graduate students interact informally with undergraduates and formally as teaching assistants (TAs). Well-trained graduate students can be talented instructors, and they play an essential role in undergraduate instruction, at minimal cost to the state. In addition, graduate students serve to stimulate faculty, and many faculty credit the quality of the graduate student population for bringing them to an institution and keeping them intellectually challenged in the classroom and laboratory.

Finally, institutions benefit from quality graduate programs both in terms of prestige and in their attractiveness to the ablest undergraduate and graduate students. Graduate programs increase the likelihood of receiving federal support for research programs. The quality of its graduates adds to the reputation of the institution, assisting development efforts, placement of new graduates, and public recognition. Graduate programs are crucial to an institution as they enhance the community of scholars and fuel the generation of knowledge.

Why does the state need graduate education?

Summary

- Individuals receive a variety of personal benefits from a graduate education: intellectual development, career advancement, and (for some occupations) a financial return on their investment through higher wages.
- Scholarship engaged in by graduate students and faculty adds to the intellectual capital of society.
- Higher education contributes to economic development, through the universities' ability to win grants and contracts, fuel technology transfer, and train a cadre of creative, innovative, and productive employees.
- The developments within the high-technology industry and the efforts of all businesses to succeed in international markets require cutting-edge research and cultural diversity.
- Graduate programs recruit and retain for Washington State many of the best and brightest graduate students from other states.
- Graduate education enhances the cultural development of society, providing arts activities and public education.

III. What principles should guide the development of graduate education?

Despite the wide diversity of graduate programs, there are at least four principles which should guide the development of graduate programs: Quality, Access, Diversity, and Consideration of the Independent Institutions.

Quality

The Master Plan stressed the importance of quality education in the development of Washington's higher education system. Given the different needs of graduate programs, can the general factors be identified which contribute to quality or can distinctions be made about the relative importance of these factors for different programs? To answer this question, the advisory committee generated a number of factors in three categories -- faculty, students, and program -- which contribute to high-quality graduate education. The committee then evaluated the relative importance of these factors for different fields and types of programs (see definitions above).

Faculty -- Not surprisingly, the one element of graduate education which received the most consistent and highest priority rating was the recruitment and retention of high-quality faculty. Faculty contribute to, and determine, the quality of a graduate program, whether that program is research-oriented track or practice-oriented, in the arts or sciences, offered at the main campus or other location. Thus, improvements made to the faculty, and support for existing faculty, will have the greatest effect on maintaining and improving the quality of the state's graduate programs.

Excellent faculty do not fit one mold. It is true that the preferred faculty employment is the full-time tenure-track position. These are the faculty who will build, maintain, and further improve a graduate program, who will work with students and provide service to the community or profession. These are the faculty who will pursue an active research program, find grant support for graduate students, supervise student research, and contribute to the discipline's fund of knowledge. To perform these duties requires dedication, a sense of responsibility for the program, and a full-time commitment.

However, many graduate programs can, and do, benefit from the contributions of other types of faculty: the adjunct (or affiliate), the clinician, or the practitioner. These faculty offer students a wealth of experience and knowledge which may not be available from anyone else. Especially for practice-oriented programs -- education, law, health occupations, etc. -- these faculty make an important contribution to the quality of the program. Clearly, adjunct faculty cannot replace the commitment and familiarity with the graduate program of full-time tenure-track faculty, but they can make unique contributions. Programs using auxiliary faculty should make every effort to ensure that program quality is maintained, especially in off-campus or other sites. Auxiliary faculty will

need to be made a part of the program, trained, evaluated, and offered appropriate assistance to carry out their duties effectively.

Research faculty can add another quality dimension to the overall graduate faculty. They bring in external grants and contracts, supporting themselves and graduate students, and allow students to be trained in laboratories and research methods which are at the cutting edge in the discipline. At little or no additional cost to the state, the research faculty can offer students a high-quality education, financial support, and the opportunity to expand the frontiers of knowledge.

The institution has the primary responsibility for recruiting and retaining quality faculty and ensuring that existing faculty develop and improve their skills. At each stage of the faculty career, the institution needs to provide opportunities for appropriate faculty development, as has been suggested by the work of Baldwin and Blackburn (1981). Faculty need new challenges and appropriate rewards for excellence. It is the responsibility of the state, through its continued commitment to quality enhancements of higher education, to provide the additional funds to reward high-quality faculty and assist faculty development toward excellence. It is the responsibility of the institution to make the difficult and unpopular decisions about which faculty perform well and which need assistance to achieve excellence.

Graduate Students -- The importance of quality faculty to graduate education is mirrored by the importance of quality graduate students. The degree of competitiveness of graduate students varies immensely among disciplines, and especially for some practice-oriented programs in applied fields, successful prior work experience is as important as academic ability.

Clearly, the operational definition of academic ability (grade point averages, Graduate Record Examination scores) is extremely important. However, research exists that questions the validity of standardized tests and their fairness for certain populations. Therefore, it is important that applicants to graduate programs be evaluated using a variety of factors, and some flexibility should be exercised in evaluating the applications of students from underrepresented populations. All of the institutions review multiple indicators of ability in admission decisions, and this practice should be encouraged and extended to new indicators, as they become available. Admission decisions will continue to be some of the more important decisions a program makes. They will remain a difficult task because they weigh the investment made in each graduate student -- by the institution, faculty, and the student -- against the loss of that investment if the student cannot complete the program.

In all fields, a diverse population of graduate students contributes to the quality of the educational experience. In many disciplines, the academic program is measurably improved by having students from different geographical areas, nations, or cultures in the classroom. These students add significantly to the intellectual content of the program,

bringing with them the histories, languages, and knowledge of peoples indigenous to a different place.

It is the responsibility of institutions to identify and recruit quality graduate students and to find new or different indicators of quality where appropriate. Both the institutions and the state share the responsibility for finding financial assistance to recruit, support, and compensate students -- as TAs or RAs, on fellowships or traineeships -- through a reasonable period of time for students to complete their studies. The institutions are responsible for ensuring that students finish their degree programs, and that their educational experience is the best feasible. Administrators, faculty, staff, and support service personnel should all work toward that goal.

Program -- Factors which contribute to a quality graduate program are several. They can be grouped into three categories: intellectual climate, resources, and professional opportunities. First, to create an intellectual climate which supports quality graduate education requires encouraging students and faculty to interrelate with students and faculty in affiliated disciplines. This requires a "critical mass" of students, faculty, and/or programs, creating the type of intellectual climate -- and level of resources or educational opportunities -- that goes beyond simply attending class. The use of telecommunications in course delivery should ensure equivalent quality to in-person faculty-student interaction, but should not be relied upon for the majority of graduate instruction. For doctoral programs especially, use of telecommunications should be carefully restricted.

Second, resources are critical to program quality. These include specialized facilities or laboratories and technicians or other support personnel. Access to quality library and computer resources is of high importance to all programs, without limitation to discipline or to whether the program is practice- or research-oriented.

Third, the quality of instruction can be influenced by several factors, including access to clinical or practical training for the professional fields and opportunities to do research if the student is pursuing a doctoral-track program. Whether doctoral-track or not, all programs need to be tied to strong, ongoing research programs which can improve and enlighten current practice. Opportunities for faculty and students to be involved in public service are also important, and not just for programs which are closely involved with serving the public. Ties to professional associations and certification or accreditation standards are a high priority for practice-oriented programs in the social sciences and sciences as well as all of the professional programs.

Each institution -- through its graduate faculty and administration -- has the responsibility for providing the highest quality education to its students. Both institution and state share the responsibility for financial support of the resources (e.g., libraries, equipment) which contribute to quality programs, including the prioritizing of the use of

resources, identifying the areas of greatest need, and justifying to an increasingly cost-conscious public the best use of constrained state resources.

Access

Certainly one of the major tenets of the Master Plan (HECB, 1987) and the "raison d'être" of the branch campuses is to increase access to higher education. Access to graduate programs will be increased through multiple aspects of the plan which follows. First, the universities will increase enrollments in graduate programs on their main campuses. Given the dependence of many programs on laboratories and library stacks, the majority of graduate enrollment growth will need to occur where the resources are already located. Second, a large portion of the enrollment growth will occur at the branch campuses, and these will be primarily in applied master's programs. Third, there will continue to be an effort to offer off-campus degree programs in disciplines which can maintain a quality educational experience without daily reliance on the facilities or library resources of the main campus. Increasing access to rural areas may also be assisted through existing and expanded efforts at telecommunications. Branch and off-campus programs will help the state equalize access to graduate education regionally, but it is important to understand that many graduate programs cannot, and should not, be offered away from the main campus. To maintain quality but increase access, the state will need to consider imaginative ways for bringing individuals to the main campuses and offering appropriate financial support.

Financial support of the graduate student -- through non-university employment, financial aid, or a TA or RA position -- is a consistently high priority across types and fields of graduate programs. Efforts to increase access will also have to recognize that the "traditional" graduate student -- the young adult proceeding directly from a baccalaureate to a graduate degree -- is now a minority of the student population; the working adult, the single parent, and the married student with a family now comprise a growing proportion of graduate students. Therefore, other types of support, such as child care, health benefits, and housing, are a high priority to both students and the programs wishing to recruit them. Increasing access is not merely adding extra space in a program, but removing the financial and other barriers to completing a degree program -- helping to ensure that the investment made in recruiting and admitting a student pays off.

The state shares with the institutions the responsibility for funding increased access, at the full cost needed for the support of quality graduate education. The institutions have the responsibility to accommodate increased numbers of students and to provide new or improved services for them. Both the state and institutions share the responsibility for finding the financial resources to fund these new, essential services, and to support graduate students as they work to complete their degree. Increasing access might also require state investments in telecommunications.

Diversity

As graduate education develops over the next 20 years, institutions and individual programs will need to increase their efforts to recruit, retain, and graduate more students from underrepresented populations. In 1989-90, only 5.8% of the master's degrees, 6.6% of the doctoral degrees, and 9.8% of the first professional degrees were awarded to minorities. However, underrepresentation is also the case for the disabled, and for women in particular fields. There will need to be similar efforts to diversify the faculty and staff of institutions, and to help the entire organization welcome and further these efforts.

The problem of insufficient numbers of underrepresented populations in graduate education begins several years before when students form their aspirations for college and enroll in academic courses. The two factors that are most influential in the decision to pursue higher education are past academic success (e.g., GPA) and family socioeconomic status. They influence the decision to undertake graduate education (Nettles, 1990), and guide efforts to increase students from underrepresented populations.

First, improving the academic preparation of these students through high school and undergraduate education will be critical (OFM, 1990). Students will also need to be identified in grade school, high school, or college and provided the extra support and academic assistance to encourage the continuation of their education through graduate school. The academic pipeline must be primed to produce the higher education faculty and staff, K-12 teachers, and other leaders that society needs and equity demands.

Second, admission standards should incorporate a comprehensive review of the student's qualifications and should not rely solely or predominantly on standardized test scores. Individuals who review applications should be aware of cultural differences and alternative learning styles and look for evidences of quality and ability to handle graduate-level coursework in letters of reference, personal statements, or interviews.

Third, especially at the graduate level, a faculty mentor is crucial -- someone who advises the student, guides his/her studies, and takes a personal and professional interest in him or her (see OFM, 1990). The mentor need not be from the same ethnic or racial population as the student; indeed, until greater diversity of the faculty is achieved, it will be essential for a wide range of faculty to take on this responsibility (Ross, 1990).

Fourth, students from an underrepresented population often do not feel as if they belong in higher education. Efforts to expand the concept of mentoring institution-wide will be important for creating the feeling of belonging and mutual commitment that produces long-term gains in student retention. To accomplish this will require that all faculty and staff be aware of hidden or imperceptible attitudes that find their way into conversation, publications, and decisions. Support services and support staff will need to be able to extend assistance to all students and offer a variety of activities designed to increase retention and student success (Clewell & Ficklen, 1987). Each interaction,

over the lunch counter, through the financial aid window, or with the departmental secretary, is an opportunity to create a sense of mutual commitment and a feeling of community.

Fifth, financial support of these students is crucial for several reasons. Like all graduate students, consistent financial support throughout the program increases retention and helps students complete their degree. The financial burdens of supporting one's self and possibly a family are also very real for the student from an underrepresented population, and financial difficulties loom as a large impediment to entering and finishing a degree program. Granting financial support is also an important means of conveying the value placed upon the individual: it is a very real form of commitment.

Sixth, an environment of commitment and community are also mirrored in the diversity among faculty and staff. At present, minority faculty comprise 7.8% of the total faculty at four-year institutions and 6.7% of community college faculty. The difficulties of hiring and maintaining a diverse faculty are outlined in Cooper and Smith (1990), which documents several means used by TESC in identifying, recruiting, and hiring faculty from underrepresented populations. More will need to be done to duplicate this effort on all of the public four-year campuses, including increased resources and the examination of institutional hiring practices.

Seventh, a sense of institutional commitment flows from a set of priorities which include diversity (de los Santos & Richardson, 1988). It is corroborated by clear policies on diversity, the public and repeated confirmation of institutional values, and procedures to discourage sexual or racial harassment. It is attested to by the presence of upper-level administrators from an underrepresented population, as well as the visible representations of many cultures. These are small acts, but effective testaments to the worth seen in the individual and the value placed on community.

Last, while the above discussion has focused primarily on diversity as it relates to underrepresented populations, the definition of diversity should be broadened to include "cultural diversity." The presence of international students and faculty clearly foster a comfort and understanding of alternative cultures, including different religions, languages, literatures, and histories, which will go a long way toward diminishing cultural parochialism and furthering internationalism in the curriculum and the workplace. Fall 1989 figures reveal that international students comprise 13.2% of the total graduate student population. Such a low percentage belies the common perception that our graduate schools are being filled with foreigners, which in turn does not credit the important contribution these international students make to the graduate curriculum and to multicultural understanding.

Institutions have initiated a variety of efforts to recruit racial minority and other underrepresented graduate students. Several state- and privately-funded fellowships are targeted for minority students at the UW, and WSU has developed a strategic plan for

recruitment of underrepresented students that allocates graduate assistantships to target and priority areas. WWU has made maximal use of partial tuition waivers to these students, and the UW will increase the share of tuition waiver monies going to minority students from 14% to 30% in 1991-92. Each institution has attempted some means of increasing the number of minority graduate students by utilization of internal, or private, resources. Given the statewide minority enrollment and graduation goals approved by the HECB (1991) for graduate education, these ad hoc programs will need to be enhanced by both institutional resources and increased state appropriations for this purpose.

The state and institutions need to share the financial responsibility of supporting a diverse student population, and institutions need to allocate increased resources to student support and student services. The institutions bear the majority of the responsibility for identifying and modifying policies and practices to create an environment that values diversity and to hire a diverse faculty and staff. Statewide goals on the recruitment and graduation of underrepresented populations have been adopted by the HECB (1991), and achievement of these statewide goals should be monitored. However, given the importance of this effort for the state's future, it will be essential that individual programs, departments, and colleges adopt their own goals and the means for achieving them. The state and institutions should monitor a variety of indicators of diversity and recognize achievement of these goals in an appropriate manner. Rewards, if considered, should be enabling and not punitive; programs should recognize that diversity is achieved by encouraging changes in values and behaviors. It will require the personal contributions of each individual and the collective will of an institution.

Consideration of Independent Institutions

Achieving the HECB goal of the 70th percentile nationwide will require the growth of graduate programs at both public and independent institutions. The involvement of independent institutions in this statewide goal is essential, since independent institutions presently enroll 32.7% of the state's total graduate students (headcount) and their 1990 enrollments (6,851) are less than one-half the enrollments at public institutions (14,127). The independent institutions are planning to accommodate enrollment growth of approximately 4,000 graduate students, compared to a projected growth of over 12,000 graduate students at public institutions, including main and branch campuses.

The relationship of the state to the independent institutions is governed, in part, by the Washington State Constitution. This study makes no recommendations concerning state support for independent institutions, yet it is clear that the health and viability of independent graduate education is of concern to the state. As the Washington State Master Plan for Higher Education stated, "Because these colleges and universities [independent institutions] educate a large number of Washington citizens, the state has a clear interest in their continued vitality" (HECB, 1987, p. 12).

The practice of enabling needy students to attend the higher education institution of their choice through financial aid programs should continue. In 1988-89, the State Need Grant (SNG) Program provided $892,650 to needy undergraduates who choose to attend independent institutions; this comprises 7.9% of the funds allocated under the SNG program (HECB, 1990). Later in this document, there appears a recommendation to extend the SNG program to graduate students and to appropriate additional funds to the program specifically to support graduate students rather than supplant needy undergraduates. This is a financial aid policy found in many states, and is a constitutional means of aiding Washington State students to attend the graduate program of their choice.

The state's need for additional graduate students, and new graduate programs, over the next two decades is overwhelming. The state's plan for graduate education depends on the contributions of all public institutions and the independent sector in order to create the highly skilled workforce the state will need in the next century. Washington will need all of its higher education institutions contributing each with their own strengths to achieve its enrollment and quality goals.

What principles should guide the development of graduate education?

Summary

- Four general principles guide the development of graduate education in the state of Washington: Quality, Access, Diversity, and Consideration of the Independent Institutions.
- Maintaining and enhancing quality includes recruiting, developing, and retaining quality faculty; finding and supporting quality graduate students; and ensuring quality educational programs.
- Quality programs depend on interaction with affiliated disciplines, appropriate facilities and up-to-date equipment, access to computers, training opportunities, and high-quality libraries.
- Increasing access to graduate programs will require that students be brought to the main or branch campuses, where the resources are available to provide a quality education.
- Cultural diversity is enhanced by international students and faculty, who can enrich the university with their cultures, languages, religions, and histories. Cultural diversity can assist in efforts to internationalize the curriculum and workplace and is a valuable part of the graduate student environment.

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What general principles should guide development of graduate education?

Recommendations

- Adjunct or affiliate faculty persons can make a contribution to quality graduate education, but they cannot replace the commitment and familiarity of full-time faculty with the graduate program. Programs using these faculty should ensure that program quality is maintained, especially in off-campus or other sites.

- Applicants to graduate programs should be evaluated on a variety of factors, to include, but not be limited to, undergraduate GPA, GRE scores, letters of recommendation, personal statements, or interviews.

- Telecommunications should provide equivalent quality to in-person faculty-student interaction, but might not be appropriate for all programs. Its use for doctoral programs should be restricted.

- Efforts to increase the diversity of graduate students should focus on improving the educational pipeline, increasing financial support and support services, and creating an environment of commitment to diversity among all facets of the institution.

- The vitality of independent institutions should be of concern to the state. Public and independent institutions should regularly share program planning information and programs offered by public institutions should be assessed for their possible impact on programs at independent institutions.

- Quality is essential for the graduate enterprise to benefit the state. Graduate programs must be incorporated into the institution's on-going assessment efforts so that the state can be confident that graduate education is meeting the needs of students and employers.

IV. What graduate programs does the state need?

The state need subcommittee reviewed occupational and other state needs for graduate programs. The full report appears as Technical Appendix A, which includes a description of the methodology, source documents, and rationales used to assess what the state needs from graduate education. The major conclusions from the subcommittee's report are summarized below, but individuals desiring additional details and a complete discussion of issues are directed to the Technical Appendix.

Occupational Growth and Professional Development

The relationship between occupations and graduate education is neither consistent nor simple. That complexity is important to keep in mind as planning for enrollment growth in graduate programs continues.

Graduate Education Required for Career Entry -- For some occupations, the graduate or professional degree is required for entry into the profession. Examples of these occupations are law (J.D.), medicine (M.D.), and university faculty (Ph.D.). However, entry-level requirements for many demanding and/or rapidly changing occupations are increasing, and occupations for which the bachelor's degree was sufficient five or twenty years ago may require master's degrees tomorrow.

Graduate Education for Professional Development -- For many occupations, the bachelor's degree is sufficient for entry into the profession. However, increasingly it is the case that graduate degrees -- more particularly the master's degree -- are the means for the individual to achieve career goals. For instance, the master's degree allows individuals to upgrade their skills if their preparation was completed several years ago or they are in a highly-technical and -evolving field. The master's degree allows individuals to change careers, prepare for advancement and promotion, and improve their productivity on the present job. Clearly, a large number of occupations fall into this category, and a large number of students enrolled in master's degree programs return for professional development. However, many individuals return to graduate school for more personal reasons, seeking intellectual challenge or rejuvenation.

Increasing Education Levels -- As has been alluded to above, occupations are increasing the education levels required for entry and for career advancement. There are a variety of reasons for this. First, as occupations attempt to gain in professional status, they increasingly require graduate education. This process is currently underway for the teaching profession, but it is a well-established process which has already affected many occupations. Second, a profession undergoing changes that increase the complexity of its tasks, such as has been the case for physical therapy, requires additional education to better prepare its practitioners. Third, as the knowledge base of an occupation

explodes with rapidly-changing, highly-technical information, it takes more education to stay current, which has been the experience of engineering and computer science.

Importing vs. Developing Graduate-Prepared Workers -- Washington State has been able to attract to the state many highly-qualified workers with graduate degrees. This should probably continue, as the state is nationally touted for its attractive quality of life. Individual businesses might also continue to recruit workers nationwide, as they attempt to maximize the diverse educations and work experiences of their workforce. A certain proportion of many new positions will undoubtedly be filled by non-residents, a proportion which is impossible to determine.

However, relying on other states to continue to supply new workers to the state has two pitfalls. First, it is policy which disadvantages Washington residents who may wish to prepare for these occupations and whose opportunity to do so is limited. Second, opportunity denied to Washington State residents to upgrade their skills also disadvantages Washington State businesses. As OFM (1989) has pointed out, a policy relying on inmigration "does not address the needs of people who lack adequate education and training among the indigenous workforce" (p. 10). This latter point is also consistent with current training and retraining philosophy, adopted from the Japanese (Dertouzos et al., 1989). As the influx of new workers into the labor force has slowed, the Japanese have emphasized training workers in multiple areas, upgrading existing workers with additional skills and education. The benefits to business are workers who bring increased flexibility and understanding of interrelationships to the workplace.

Clearly, the opportunity for graduate education should not be denied or constrained for present Washington residents. It is inequitable that Washington residents should have denied to them the professional preparation and development opportunities that are accorded residents of other states. Washington business should have the opportunity to continually upgrade its existing workforce. Access to graduate programs will be key to supporting the development of individual careers and business health. Also, graduate programs will be an important means to increasing the participation and graduation of minority or other underrepresented populations to produce a diverse state workforce. As the state's minority populations grow in number and proportion of the total, the state will need to access these populations for able and creative workers.

Methodology

The subcommittee prepared the following occupational projections by referring to a variety of sources of information. First, the Washington State Employment Security Department's (1989) Occupational Projections: 1988-1993 for the entire state provided the base information for this report. The subcommittee used the occupational categories of ESD, and relied upon these projections as a consistent foundation for the study. These projections do, however, have several drawbacks, not least of which is their

derivation from employers covered by unemployment insurance regulations. Therefore, occupations more prone to self-employment are not sufficiently incorporated. The second drawback is the projections' timeliness; the base year for the ESD figures was 1987, a long way from 1990 and a longer distance from 2010. These figures are therefore conservative and inadequate to base planning for graduate programs in any year beyond 2000.

Second, independent occupational projections or needs assessments were sought from state agencies as well as state professional associations. Third, each occupation was reviewed for present (or prospective) educational requirements for career entry. Information on the percent of existing workers with 18 or more years of education (master's degree or higher) allowed a reference for estimating how many individuals might pursue graduate education for professional development reasons. Fourth, the ESD occupational projections by county were reviewed to provide a regional description of occupational need. Also, where available, regional needs assessments and other sources of information were reviewed. To confirm these projections, local Economic Development Councils were asked to provide employment profiles for their service areas.

Last, the assessment of need by numbers (of openings, of employees, of businesses) had to be tempered by a sense of social need or other policy. This required going beyond the numbers to what is best for the state of Washington. Some occupations might simply be more crucial to the state than others. However, these recommendations are time-dependent, reflect immediate needs, and should be reviewed for changing conditions.

ESD projections should not dictate the exact growth in program enrollments. The information provided on occupational growth is intended to provide a sense of magnitude of growth, and a range of additional enrollments to satisfy the occupation's need for new entrants or professional development. Any greater specificity should be eschewed as it cannot be justified by the quality or reliability of the data at hand.

Occupational Projections

Appendices A and B of the state need subcommittee report duplicate the ESD projections for a) total employment in the occupation and b) annual average job openings for two categories of job classifications: Managerial and administrative occupations, and Professionals, paraprofessionals, and technicians. These two categories were most likely to contain those occupations requiring graduate degrees for entry into the profession, and most likely to depend on graduate education as professional development. Exceptions are, of course, not uncommon. Individuals in many occupational categories can seek and benefit from graduate education, but the subcommittee's efforts were limited to these categories. Also, rather than attempt detailed projections of sub-categories of occupations (e.g., electrical, chemical, materials engineering), projections are for an

occupation, broadly defined (e.g., engineering). While specificity might be lost, greater confidence in the overall results was gained. For the same reason, while individual needs assessment results may provide specific growth rates, the subcommittee chose to place occupations into four growth categories:

Category	Growth per year
Decline/No growth	< 0%
Modest growth	1 - 5%
Moderate growth	6 - 10%
High growth	10% +

For a detailed discussion of occupational projections by occupational grouping, please refer to the state need subcommittee document in Technical Appendix A.

Projected Enrollment Needs

Enrollments to Support Occupational Growth -- The majority of occupations reviewed were projected to have "modest" growth, or 1-5% annual growth in workers. For occupations where graduate preparation is required to enter the profession, degree production should be roughly equivalent to the number of position openings. For occupations where graduate preparation is not necessary but is appropriate for professional development and career advancement, degree production need not approximate the growth of openings. However, program capacity should be sufficient to respond to the professional development needs of the existing workforce. Table 2 reviews the occupations, their growth category, and a range of enrollment growth to handle either the growth in new or replacement positions or the growth needed in professional development opportunities.

Table 2
Occupational Projections, Growth Category, and Areas of Special Need

Occupation	Growth Category	20-Year % Growth	Areas of Special Need
Management	Modest	20%-100%	--
Engineering	Modest	20%-100%	High
Scientific	Modest	20%-100%	High
Social Science	Modest	20%-100%	--
Lawyers	No Growth	0%	--
K-12 Teachers	Modest/Moderate	See Notes	High
Higher Ed. Faculty	Modest until 2000 Moderate after 2000	10%-50% 60%-100%	High
Health			
Physicians/Dentists	Modest	20%-100%	--
Veterinarians	No Growth	0%	--
Physical Therapists	Modest	20%-100%	--
Pharmacists	Modest	20%-100%	--
Nurses	Moderate	100%-200%	High
Fine Arts	Modest	20%-100%	--

NOTES: (1) Need for K-12 teachers is difficult to predict, since it depends on population growth, in-migration, teachers returning to the occupation after a hiatus, and teacher retirements; see teacher subcommittee report, Technical Appendix B, for complete discussion. (2) Need for higher education faculty includes community college and 4-year faculty; estimates include faculty retirements and additional faculty to handle enrollment growth as per HECB enrollment plan. (3) The entry-level degree for physical therapists will soon be the master's, and program capacity will need to accommodate training new professionals and the upgrading of existing professionals. (4) Entry-level preparation for pharmacists may become the Pharm.D. and growth in program capacity may need to correspond to the need for new professionals and the upgrading of existing professionals.

Areas of Special Need -- Translating occupational growth estimates into graduate enrollments is a difficult proposition which becomes even more difficult when the state's resources are severely constrained. Answering the question, "What does the state need?" requires a more thoughtful and more difficult assessment than the easy answer, "More of almost everything." In light of the state's need to maximize its resources and allocate those resources to achieve specific policy ends, four occupational areas should receive special consideration.

I. Nursing to Ensure Sufficient Health Care -- The nursing shortage has several implications for graduate education and the state. Clearly, the state and its citizens benefit from the provision of sufficient quality health care, and nurses are integral to quality health care. Increased enrollments in baccalaureate-level nursing programs are already planned to respond to these problems, but increased capacity in master's-level programs will also need to occur to provide faculty for

A.D.N. programs, to train nurse practitioners, and to prepare nursing administrators who will oversee the additional nurses needed. For these reasons, it makes sense to consider graduate-trained nurses a "special need" occupation, requiring additional FTE enrollments in nursing programs.

Other health care professions are clearly important, but they illustrate a problem of distribution more than of supply. The preference of many professionals for urban areas leaves many rural communities underserved, but this is a problem beyond the capability of higher education to solve or that cannot be solved simply through an increased supply of graduates from health-related programs.

II. Support for Economic Development Initiatives -- Graduate education can and should be called upon to support the state's economic development efforts. This will mean sufficient program capacity in scientific and technical fields, including engineering and computer science, to prepare additional graduates in these fields. Interest in improving degree production in these fields is not limited to Washington State, but is consistent with national efforts to recruit able individuals into these fields. In other words, the potential benefits to be gained from additional graduates justify increased efforts to recruit and educate these individuals. However, it is expected that the majority of enrollments will probably be filled by working individuals seeking professional development and upgrading of their technical skills. These individuals will play a significant role in improving Washington business and economic competitiveness. For these reasons, it is recommended that science, computer science, and engineering graduate program enrollments be placed in a "special need" category.

III. Contribution to Faculty Ranks -- The data on faculty retirements and the need for additional faculty to handle the enrollment growth planned by the HECB indicate a need to allocate resources to prepare future university and community college faculty. Enrollments should be increased in two broad groupings of programs: 1) master's degree programs which prepare community college faculty and 2) doctoral-track programs (master's and Ph.D. programs). These enrollment increases will need to occur in a variety of disciplines. The preparation of community college faculty should be shared among the comprehensive and doctoral institutions; the preparation of university faculty should be the predominant responsibility of the doctoral institutions. However, all institutions will need to play a significant role in identifying and preparing undergraduates who are able to serve as teachers and/or researchers in the state's higher education system. Washington State will benefit to a large extent from this increased effort, as many graduates should continue to stay in the state to teach.

IV. Efforts to Improve K-12 Education -- Probably more than any other need, the state needs excellent teachers in its K-12 system. Improvements made in K-12 education produce better college students, which in turn improves the environment

for higher education. There is also a moral obligation to provide public service to the community and schools, a service which should not be the sole responsibility of the colleges or schools of education. Responsibility for improving K-12 education should be the province of the entire university, both academic disciplines and schools of education.

In this case, state resources would best be spent for programs that would provide teachers an opportunity to earn a master's degree in a content area over three summers. This degree would be modeled after the Master of Arts in Teaching, or M.A.T., which improves teachers' preparation in a discipline or set of disciplines, with some emphasis on pedagogy. According to the 1990 HECB teacher survey, language arts, art and creativity, the sciences (individually or in a multi-disciplinary format), mathematics, political science, and computers would be fields of interest to many teachers.

Also, as the Master's in Teaching (MIT) degree becomes the preferred preparation for a teaching career, MIT programs will need to be expanded. The MIT, which builds upon a baccalaureate degree in a content area(s), has the potential to prepare new teachers for new professional demands as educational reforms are implemented, tested, and modified.

The Need for a Self-Correcting Planning Process -- The review of occupational needs summarized in this document was based to a large extent on projections completed in 1987 (ESD, 1988), or prepared for another purpose (health professions needs assessments), or done on an ad hoc basis (faculty retirement data). These data are sufficient to support a tentative plan for graduate enrollment growth for 1990-2000, but they should not be used for planning purposes beyond those dates. Graduate programs are, and should be, very responsive to the needs of the community, and they should be tailored to changing economic conditions, new technologies, and professional practices. Some graduate programs have developed very recently from new scientific discoveries, research trends, and interdisciplinary programs and this responsiveness should be encouraged and supported.

Future planning for graduate programs should be done on a regular, four- or six-year cycle. This would allow for appropriate course-correction to the present plan. Subsequent plans would incorporate more current occupational information, respond to changed certification or other requirements, and support evolving needs of the state.

At present, no statewide needs assessment of the general public's interest in graduate education has been done. Discrete needs assessments of this nature have been done for certain areas (Puget Sound, branch campus locations), but not for the state as a whole. Information on the public's intent or need to pursue a graduate program would assist in targeting graduate education to a particular region or occupation

or evaluating the relative merits of multiple requests. Such a needs assessment would require a state appropriation for this purpose.

The Extent of Regionalization of Graduate Education -- Graduate programs cannot be delivered in all regions of the state. While the need for graduate education may extend to every corner of the state, many quality degree programs cannot be taken off the main campus, due to their heavy dependence on libraries, computer resources, laboratories, or the need for interactions with faculty, other students, or other disciplines.

Practical factors inhibit taking programs off campus as well. First, the use of telecommunications to serve rural, isolated areas of the state suffers from two limitations. Not all degree programs may be suitable to delivery over telecommunications, without substantial on-campus work. Also, some types of telecommunications technology require substantial cost in terms of equipment, upkeep, and operations. It is an expensive front-loaded investment. However, telecommunications technology continues to evolve, offering improvements in quality and decreasing the cost and size of the initial investment. Second, off-campus degree programs entail costs which cannot be adequately captured or compensated. They may require an extensive commute for faculty to travel to off-campus delivery sites and return, which takes time and may reduce faculty productivity and the quality of the on-campus and off-campus instruction.

Third, off-campus programs must be adequately supported with appropriate library materials or the off-campus student must be able to gain access to libraries on campus. Fourth, the need for a stable and sufficient number of students interested in a degree program will also limit the viability of off-campus programs in rural or isolated communities. If an off-campus program will be offered on a self-sustaining basis, there must be a sufficient number of students interested in the same degree program to cover the full costs of a degree program.

Clearly, other means of allowing potential students from rural, isolated communities to earn a graduate degree should be developed. Employers might consider sabbatical programs for employees wishing to take time off to complete a master's degree. Institutions might develop relationships with employers or communities to support a graduate student for one year. Private funding could be matched by state appropriations to the Graduate Fellowship program to endow a fellowship for such a relationship. Teachers from small communities might need to attend a master's degree program offered over three summers, and institutions would need to design such programs and allocate summer housing for teachers. These suggestions are not exhaustive, but point to imaginative means of bringing students to the main campus, where necessary supporting resources are already in place.

A Special Case of State Need: Master's Degrees for Teachers

The teacher subcommittee studied the demand for, and supply of, master's degree programs for continuing teachers (see Technical Appendix B). A statewide mail survey of teachers without master's degrees was conducted to estimate the amount and nature of interest in pursuing a master's degree. Survey results estimate 9,665 teachers expect to enroll in a master's degree program in the next five years.

A survey of the institutions offering graduate degrees in education in the state of Washington detailed the supply and capacity of existing and prospective master's degree programs. Along with an estimate of new teachers entering the system (who would in turn want a master's degree), an estimate was made of how long it would take for the teacher demand to be satisfied by the existing supply of programs. The HECB reviewed and adopted a policy which endorsed meeting the current and prospective demand for master's degrees for teachers through existing and planned expansion of programs, with a goal of fulfilling the estimated demand no later than 1999-2000.

What graduate programs does the state need?

Recommendations

- The majority of degree programs should increase their graduate enrollments between 1% and 5% per year, to accommodate occupational growth and professional development needs of existing employees.

- The nursing shortage requires additional enrollments and higher growth in graduate programs.

- Support for economic development initiatives requires enhanced enrollments in engineering, computer science, and science and technical programs.

- Due to increased faculty retirements and the need for additional faculty to handle enrollment growth, enrollments should be increased in a) master's degree programs which prepare community college faculty and b) doctoral-track (master's and Ph.D.) programs in a variety of disciplines.

- Universities should develop M.A.T. programs, to be delivered over three consecutive summers, for K-12 teachers to earn a content-area master's degree.

- Future planning for graduate programs should be done on a regular, four- or six-year cycle, to update the occupational projections in this study and to respond to unforeseen changes in the economy or local communities.

- A statewide needs assessment of the general public's interest in graduate education would assist HECB planning and evaluation of program proposals.

- Few graduate degree programs can be offered at equivalent quality in rural, isolated communities or can be offered on a self-sustaining basis. Thus, other means should be found to allow students to pursue graduate education on the main campuses: sabbaticals, employer relationships, or summer-only programs.

V. What should be the state's plan for expansion of graduate enrollments?

Institutional Projections: Public Four-Year Institutions

The institutions offering graduate programs in the state of Washington were asked to provide Fall 1990 enrollment figures, by graduate program, and then estimate the number of graduate students each program could enroll in 1995, 2000, and 2010. They were also asked to propose any new degree programs which might be a likely addition to the institution's offerings and estimate the resources needed to handle new programs. It was assumed that programs would be funded on a full-FTE basis, and thus faculty positions could be added to handle enrollment growth. Resources identified for the addition of new programs included new specialized equipment, office space, FTE faculty positions, and other space. Institutions were asked to identify enrollment by location: main, branch, and off-campus, as appropriate.

Each institution undertook its planning process in a different manner, appropriate to its internal review structure. The input of deans, directors, and faculty was expressly sought, but the short timeline limited the involvement of the entire community. The graduate dean was responsible for each institution's plan and clarifying issues which could impede or contribute to graduate enrollment growth.

It is important to note that time constraints placed upon this study required that planning undertaken by each institution occur at the same time as the state need information in the previous section was being collected, compiled, and evaluated. Thus, the institutions did not have the information in section IV to inform their planning efforts.

A short description of each institution's plan follows. Not surprisingly, each plan is different, capitalizing on institutional strengths and market forces. The estimates for enrollment growth are highly speculative, and are dependent on receiving sufficient funding to support graduate students, library enhancements, equipment, etc. For each institution, the disciplinary areas of new degree programs under consideration for the later years are listed, but since the need for each program is speculative, there will be no attempt to evaluate some of the programs planned.

University of Washington -- The plan for graduate education from the University of Washington adds 100 students in Ph.D. programs on the main campus per year from 1991 through 2010. Additional enrollments are planned beginning Fall 1991 in applied master's programs at the branch campuses. The Evening Degree Program to be offered on the main campus will involve increased enrollments in select disciplines; enrollment projections by discipline are highly tentative at this time. These projections assume full branch campus funding.

Enrollment growth will occur in only those fields where applications to the graduate program have greatly exceeded available space. In addition, enrollments will only be allocated to Ph.D. programs of the highest quality as determined by their national or international reputations. No new degree programs were proposed at this time.

Washington State University -- The Washington State University plan includes growth both at the master's and doctoral level, in both practice-oriented master's and doctoral-track programs. The main campus will handle the majority of doctoral students, though doctoral programs are tentatively planned for the Spokane branch campus. The branches will concentrate on practice-oriented master's and some doctoral-track master's degrees, and are planned to grow to equal 38.3% of all graduate enrollments at WSU. Graduate enrollment on the main campus is planned to grow to approximately 15% to 20% of total enrollments over the planning period.

New main campus degree programs are planned to be implemented by 1995; a doctorate and two master's in science disciplines, plus three master's in education areas. The majority of the branch campus programs are extensions of main campus programs and are listed in Design for the 21st Century (HECB, 1990); new degree programs proposed for the branches include a practice-oriented doctorate in pharmacy in Spokane and master's degrees in science, education, and management areas at all branches.

Central Washington University -- Projections of potential growth for CWU have assumed that funding for a new, five-year M.A.T. degree program for teacher preparation is forthcoming. Enrollment figures for 1995 halve the growth necessary to reach the figures for 2000, and enrollments for 2010 include several new master's-level programs. It is Central's goal to have graduate students eventually comprise 10% of total student enrollments. Included within the CWU figures are 105 state-funded enrollments at the South Seattle Center, which offers several education master's programs at an off-campus location.

While Central's graduate enrollment has increased by 34% over the last 3 years, its graduate enrollment in the summer continues to be higher than in the academic year. For example, during Summer 1990, 415 graduate students were enrolled compared to 364 during Fall 1990. Moreover, Central's summer enrollment tends to be heavily in master's degrees in education (63.8% of total). Since the state's plan is based on academic-year (state-funded) enrollments, the fairly substantial group of teachers attending in the summers only will not be counted toward the 70th percentile goal. This is an important caution which applies to all of the institutions.

New programs by the year 2000 include master's preparation for teachers in humanities, social sciences, and science. New programs beyond 2000 are more speculative, and include three master's programs in the sciences, two in the social sciences, and individual programs in the arts, allied health, family/other, engineering technology, and business administration.

Eastern Washington University -- The plan for Eastern's graduate enrollment growth is concentrated in existing professional programs and the creation of new programs which extend existing programs in new directions. For example, the M.B.A. program would like to add specialties in accounting and health care administration. Several professional programs are slated for relocation to Spokane, and others will continue to operate at both Cheney and Spokane locations. The M.B.A. will move to Spokane; the M.Ed. programs (of which there are several) may offer coursework in Cheney and Spokane. It is Eastern's intention to allow graduate enrollments to grow to comprise approximately 14%-15% of the university's total enrollments by the end of the planning period.

Modest but consistent enrollment growth is slated to occur in existing programs (e.g., nursing, education, allied health). New programs under consideration include single master's degrees in education and social sciences, three programs in the sciences, and three in allied health.

The Evergreen State College -- At the present time, TESC offers only three graduate programs, and expects to remain primarily an undergraduate institution in the years ahead. The three existing programs -- an M.P.A., Master's in Environmental Studies, and M.I.T. -- will probably grow modestly over the planning period. TESC is considering a weekend M.P.A. program and adding an interdisciplinary science emphasis to the M.E.S. program by 1995.

Western Washington University -- The potential growth areas for Western build upon existing strengths in the liberal arts and some professional programs. The largest enrollment growth is slated to occur in master's degree programs in education, in response to the increased interest from teachers. Western would like to achieve and maintain a level of graduate enrollment that comprises 10% of total enrollments: a goal which should be achieved in the proposed plan by 2000. New master's degree programs have been suggested in science and education areas, as well as select social science and humanities disciplines.

A compilation of these enrollment projections by institution appears in Table 3. These projections should continue to be taken as highly speculative; they assume full-FTE funding for the additional enrollments and that increases in undergraduate enrollments will occur as planned in Design for the 21st Century (HECB, 1990).

Table 3
Prospective State-Funded Graduate and Professional Enrollments -- Publics

	1990	1995	2000	2010	20-Year Growth #	20-Year Growth %
UW Seattle	8970	9470	9970	10,970	2000	22.3%
Evening	--	500	1000	1500	1500	--
Bothell	--	200	600	800	800	--
Tacoma	--	300	700	1000	1000	--
Total UW	*8970*	*10,470*	*12,270*	*14,270*	*5300*	*59.1%*
WSU Pullman	*2225*	*2916*	*3391*	*3843*	*1618*	*72.7%*
Southwest	*124*	*578*	*652*	*717*	*593*	*478.2%*
Tri-Cities	*377*	*757*	*842*	*896*	*519*	*137.7%*
Spokane	*81*	*557*	*623*	*632*	*551*	*680.2%*
Total WSU	*2807*	*4808*	*5508*	*6088*	*3281*	*116.9%*
CWU	364	532	700	1000	636	174.7%
EWU	1212	1517	2047	2509	1297	107.0%
TESC	202	315	345	345	143	70.8%
WWU	572	910	1105	1115	543	94.9%
TOTALS	14,127	18,552	21,975	25,327	11,200	79.3%

NOTES: (1) 1990 figures are Fall 1990, and do not include students on leave, or whose status is unknown. (2) Also, where a planning figure was not provided for an interim year, the difference from earlier to later figures was split. (3) CWU figures include state-funded FTEs at South Seattle Center.

Institutional Projections: Independent Four-Year Institutions

The independent institutions offering graduate programs in the state of Washington were also asked to provide planning information for the study. Each institution assessed the growth in graduate enrollments based on capacity, both physical and human, and potential areas of demand for programs. A brief review of each institution follows; total estimates of graduate enrollment growth are compiled in Table 4.

Gonzaga University -- A detailed description of Gonzaga's present offerings in the Spokane area appears in the Spokane subcommittee report (see Technical Appendix C). Gonzaga presently offers several off-campus degree programs in education in communities across the state. The university plans to maintain this effort as long as the pressure for master's degrees among teachers continues (estimated to slow considerably by 2000). Gonzaga has also initiated an off-campus master's program for rural

placebound nurses, which will combine video instruction and on-campus coursework. Moderate growth in on-campus graduate programs should occur in arts and sciences and the professions (e.g., business, engineering, law).

Heritage College -- Heritage plans to expand its graduate enrollments at the main campus location near Yakima and selected sites in eastern Washington. All graduate programs are in the education field, and growth is expected to occur at approximately 35-40 new students per year.

Pacific Lutheran University -- PLU plans growth in enrollments from 1990 to 2010 in the four professional areas in which it offers graduate degrees. These four areas include business, computer sciences, education, and nursing, but growth is also expected in graduate programs in music and social science plus a new program in physical education.

Seattle Pacific University -- SPU projects large growth in its enrollment in education master's degree programs. Growth is also expected over the planning period in existing graduate programs in arts and letters, social sciences, business, engineering, and health.

Seattle University -- SU is planning moderate growth in existing graduate programs in business, education, public administration, and software engineering. Some of the business and education enrollments are in off-campus degree programs. Graduate programs in psychology and theological studies will likely remain at a consistent level of enrollments throughout the planning period. New degree programs are projected by 1995 in two areas -- engineering and nursing -- to be added to the main campus. Seattle University has as its goal for graduate enrollments to reach 40% of the university's total enrollments by the year 2000.

St. Martin's College -- St. Martin's is planning growth in graduate enrollments in existing programs in two disciplinary areas (arts and letters, social science) and the professional fields of business, engineering, and education. A new degree program in nursing is planned for implementation by 1995.

University of Puget Sound -- UPS is planning consistent enrollments from 1990 to 2010 in its four professional master's degree programs in education and allied health areas. No new master's degree programs are planned at this time. UPS expects that enrollments in its law program will decline then remain steady throughout the planning period.

Walla Walla College -- Walla Walla College did not provide planning information to the study and therefore could not be included in the state's projections for graduate enrollment growth.

Whitworth College -- The existing master's degree programs offered by Whitworth College are described in detail in the Spokane subcommittee report (see Technical Appendix C). Generally, Whitworth plans for growth in its master's degree programs in education, and expects to initiate a new master's degree in international business by 1995 as a part of its contribution to SIRTI.

Table 4
Prospective Graduate Enrollments -- Independents

	1990	1995	2000	2010	20-Year Growth #	20-Year Growth %
Gonzaga Univ.	1637	2045	1900	1965	328	20.0%
Heritage	450	700	1000	1200	750	166.7%
Pacific Lutheran Univ.	642	790	895	1010	368	57.3%
Seattle Pacific Univ.	656	1336	1711	1836	1180	179.9%
Seattle Univ.	1554	1805	1975	2205	651	41.9%
St. Martin's College	204	339	379	414	210	102.9%
Univ. of Puget Sound	1103	1053	1053	1053	-50	-4.5%
Whitworth College	605	735	850	1110	505	83.5%
TOTALS	6851	8803	9763	10,793	3942	57.5%

NOTES: Walla Walla College did not provide planning information.

Total Graduate Enrollments

Table 5 compiles the prospective enrollment figures from the public and independent institutions for the entire planning period. These enrollments do not include self-sustaining degree programs or summer-term enrollments. The future enrollments in self-sustaining and summer programs are difficult to predict and therefore are not incorporated into this plan.

Table 5
Total Prospective Graduate Enrollments – Publics and Independents

	1990	1995	2000	2010	20-Year Growth #	20-Year Growth %
State-Funded (Publics) Enrollments	14,127	18,552	21,975	25,327	11,200	79.3%
Independent Institutions Enrollments	6851	8803	9763	10,793	3942	57.5%
TOTALS	20,978	27,355	31,738	36,120	15,142	72.2.%

Comparison to HECB Enrollment Plan

The above institutional plans allow us to finally answer several important questions. The first question is based on the institutions' best efforts at projecting future capacity, *Can the state achieve its goal of enrolling graduate students at a rate equivalent to the 70th percentile nationwide by 2010?* Design for the 21st Century estimates the total number of students needed to be 40,030 (see Appendix B). Assuming that the institutions will grow as suggested in Table 5, the shortfall of needed graduate students is approximately 3,910.

But these plans include degree-seeking students only. The calculation of the enrollments needed to reach the 70th percentile used the IPEDS database which included post-baccalaureate students. Approximately 50% of the post-baccalaureates (non-degree) in 1990 were teachers pursuing their fifth-year certificate, who will probably pursue a master's degree program in the future. The other 50% of the projected post-baccalaureate students are added at the bottom of Table 6, which compares the HECB graduate enrollment plan to the institutions' plans. If post-baccalaureate students are included, it is likely that the state can achieve a rate of graduate enrollment very near the 70th percentile nationwide by 2010. However, achieving this level of enrollments will entail concerted and consistent investment in graduate education.

The institutions' plans for graduate enrollment growth appear side-by-side in Table 6 with the HECB enrollment plan. First, the UW main campus is planning to grow at a similar rate to that originally planned. The UW branch campuses are expected to reach the same size as had already been projected by 2010; the evening degree program will also grow as planned. The growth planned for WSU is more rapid than originally planned, but the branch campuses are not planned to reach the 2010 projected enrollments. Three comprehensive institutions are projecting greater growth in graduate enrollments than was originally planned, and TESC will undergo modest graduate enrollment growth in keeping with its undergraduate mission. Last, the independent institutions are planning enrollment growth which is slightly more than that originally planned. All in all, the differences between the HECB enrollment plan and the plans provided by the institutions are small.

The State Plan will adjust the institutional plans to meet the 70th percentile enrollment goal.

Table 6

Comparison HECB Plan vs. Institutional Plans -- Headcount Enrollment Growth

	HECB Enrollment Plan			Institutional Plans		
	1990	2000	2010	1990	2000	2010
Independent Institutions	6950	8550	10,000	6851	9763	10,793
Public Institutions	15,150	17,340	20,730	12,945	16,758	18,782
(Excludes sites below)						
UW Bothell	0	700	800	0	600	800
UW Tacoma	0	700	1000	0	700	1000
WSU Southwest	170	500	1000	124	652	717
WSU Tri-Cities	360	440	500	377	842	896
WSU Spokane	100	450	1000	81	623	632
UW Evening	0	700	1500	0	1000	1500
Total Branches	*630*	*3490*	*5800*	*582*	*4417*	*5545*
EWU Spokane Center	600	800	1000	600	800	1000
Unallocated	0	0	2500			
TOTAL	23,330	30,180	40,030	20,978	31,738	36,120
PERCENTILE	22nd	50th	70th			
[Post-baccalaureates:*	*included*			*2000*	*2500*	*3000]*
[Unallocated:				*Δ352*	*NA*	*Δ910]*
[REVISED TOTAL:				*23,330*	*34,238*	*40,030]*

** Approximately 50% of post-baccalaureate students enrolled in the base year were education students pursuing their 5th-year continuing certification. It is anticipated that these students will be replaced by master's degree-seeking students by 1995.*

SOURCE: Design for the 21st Century (HECB, 1990, p. D2).

Enrollments and State Need

The second question these plans allow us to answer is, *Have the institutions planned for enrollment growth where state need has been indicated?* An earlier section of this report summarized the recommendations of the state need subcommittee, which estimated needed enrollment growth based on a variety of occupational projections. Table 7 combines the public and independent enrollment projections by field, and compares planned growth against the percent growth suggested by the state need subcommittee.

Table 7

Enrollment Growth by Field -- Based on Institutional Plans of Publics and Independents

				10-Year Growth	Range of
	1990	1995	2000	%	Growth
Arts & Sciences					
Arts	507	629	744	46.7%	10%-50%(a)
Humanities	1067	1389	1572	47.3%	10%-50%(a)
Social Sciences	1779	2407	2890	62.5%	10%-50%(a)
Sciences	1672	2412	2922	74.8%	10%-50%(a)
Professional Fields					
Business & Mgt.	2215	3066	3748	69.2%	10%-50%
Education	4953	7328	8403	69.7%	50%-100%(b)
Public Adm. & Plan.	624	687	730	17.0%	10%-50%
Social Work	454	478	508	6.3%	10%-50%
Library Sci.	176	176	176	0.0%	10%-50%
Legal Studies	36	36	36	0.0%	0%
Family/Other	52	73	101	94.2%	10%-50%
Architecture	219	254	264	20.5%	10%-50%
Engin. & Tech.	1683	2307	2867	70.4%	50%-100%
Forestry	177	177	177	0.0%	10%-50%
Fisheries	311	311	311	0.0%	10%-50%
Agriculture	155	176	209	18.8%	10%-50%
Nursing	428	732	925	116.1%	50%-100%
Allied Health	384	518	707	84.1%	10%-50%
Public Health	302	342	382	26.5%	10%-50%
Medicine	233	288	343	47.2%	10%-50%
Dentistry	59	59	59	0.0%	10%-50%
Pharm. Sci.	103	118	128	24.3%	10%-50%
Vet. Sci.	67	92	107	60.0%	10%-50%
Interdisciplinary	219	273	327	49.3%	(c)
Other (Unclassified)	153	81	81	-47.1%	(c)
First Professional					
J.D.	1784	1763	1813	1.6%	0%(d)
M.D.	644	644	644	0.0%	10%-50%(d)
D.D.S.	204	204	204	0.0%	10%-50%(d)
D.V.M.	305	312	312	2.3%	0%(d)
Pharm.D.	13	23	48	269.2%	10%-50%
TOTALS	20,978	27,355	31,738	51.3%	

NOTES: (a) Due to the growing demand for higher education faculty after 2000 and the 5- to 10-year time-to-degree for master's and doctoral degrees, enrollments in the arts and sciences should be at the high end, or exceed, the growth range continuum. (b) This is short-term growth (for 5-10 years only). See teacher subcommittee report in Technical Appendix B for complete description of the type, number, and size of master's degree programs for teachers, a large percentage of which will be self-sustaining programs and not included in this plan. (c) The need for enrollment growth in interdisciplinary and unclassifiable programs is impossible to predict. (d) Occupations for which Washington institutions provide professionals to the region are difficult to predict. (e) See Appendix C for public and independent enrollment plans by field, and field definitions.

Generally, the institutions are planning enrollment growth in occupations and within the range of growth indicated by this study's assessment of state need. Clearly, most enrollment growth is in the modest range (1% to 5% per year growth, or 10% to 50% total growth over 10 years). The fields with growth greater than the range indicated in the last column are discussed below.

First, "business and other management" is planned to grow slightly more than indicated by state need. This category includes enrollments planned in M.B.A. programs, but also specific management-related programs such as agricultural business and health care administration. These other specific management fields are expanding while M.B.A. graduates are having difficulty finding employment. Part of the growth in M.B.A. enrollments is extending the program to sites without access to the degree program, and thus may be justified. The greater than predicted enrollments in this field may be acceptable, but should be held to no more than is presently projected.

Second, the growth in "family/other" is specifically in programs of family studies, food science, apparel merchandising, and other, correlative, programs. These are considered professional preparation for counselling, research, and business or merchandising positions. The growth in enrollments projected for these programs is probably appropriate.

Third, the growth in "veterinary sciences" is an appropriate reallocation of enrollments from the D.V.M. program during a time when the profession is suffering a temporary over-supply of practicing veterinarians. There is a demand and growth opportunity for research and auxiliary professions which require preparation in the veterinary sciences.

Fourth, the large growth in enrollments in Pharm.D. programs assumes that it may become the entry-level degree for pharmacists after the year 2000. This will create a demand among existing pharmacists to upgrade their bachelor's preparation to stay competitive in the profession. Since these entry-level requirements are still under discussion by relevant state and professional associations, the situation will need to be closely monitored and enrollment plans adjusted if changes so indicate.

The State Plan will adjust these over- and underestimates of occupational growth.

New Faculty

As was outlined in the state need subcommittee report, the state must consider its future needs for master's and doctoral-trained faculty and look to its own institutions to produce a share of the state's future faculty. In an ad hoc survey of new faculty hired within the last two years, the two doctoral institutions indicated that they had hired 33 faculty (10.31% of total faculty hired) whose highest degree came from a Washington

institution. Similarly, the comprehensives and TESC hired 13 faculty (13.8% of the total) and the community colleges hired 140 faculty (47.0% of their total new faculty) whose highest degree came from a Washington institution. These proportions will most likely increase as faculty retire and opportunities to teach in a four-year or community college expand.

Table 8 estimates total additional cumulative faculty needed to accommodate the state's enrollment growth and projected retirements (the state need subcommittee report, in Technical Appendix A, has additional background information).

Table 8

Estimates of Additional Cumulative Faculty Needed to Accommodate Enrollment Growth and Projected Retirements for Public Four-Year Institutions and Community Colleges

	Due to Retirements		Due to Enrollment Growth		Cumulative
	4-Year	CCs	4-Year	CCs	Total
By 1995	564	253	615	99	1531
By 2000	1197	609	1187	318	3311
By 2005	1908	1087	1841	541	5377
By 2010	2767	1577	2939	807	8090

A third question can now be addressed. *Are the plans submitted by the institutions preparing for sufficient master's and doctoral-level enrollments?* Previous tables aggregated all graduate enrollments across master's and doctoral levels. Table 9 presents a rough breakdown of the plans by level of enrollment.

Table 9

Estimates of Master's and Doctoral-Level Enrollments (State-Funded, Public Institutions)

	1990	1995	2000	2010
UW				
Master's	5094	6094	7394	8394
First Prof.	1324	1324	1326	1329
Doctoral	2552	3052	3550	4547
WSU				
Master's	1673	3346	3819	4190
First Prof.	305	322	347	357
Doctoral	829	1140	1342	1541
CWU				
Master's	364	532	700	850
EWU				
Master's	1212	1517	2047	2509
TESC				
Master's	202	255	285	285
WWU				
Master's	572	910	1105	1115
Doctoral as % of Total	*23.9%*	*22.6%*	*22.3%*	*24.0%*

NOTES: (1) Master's includes both research-oriented and practice-oriented programs. (2) Doctoral includes post-master's and doctoral candidates. (3) First professional includes J.D., D.D.S., M.D., D.V.M., and Pharm.D.

Clearly, individuals with doctorates (or master's degrees) can fulfill many roles and we need not assume they all will choose to become university or community college faculty. In fact, a national study found that only 40% of doctoral-level students intend to pursue a career as university faculty (NRC, 1989). If 40% of the 3381 doctoral enrollments in 1990 -- who will take 5-10 years to complete their degrees -- intend to teach, then approximately 1200-1350 potential new faculty will be available by the year 2000. However, the number of new faculty that will be needed at the four-year institutions from 1990-2000 will be approximately 2384. Washington may experience a serious faculty shortage. While any analysis of the need for doctorally-trained faculty cannot assume that Washington institutions will supply all new faculty needed by the state, Washington institutions will need to contribute more faculty than in the past. This will require new enrollments, especially in the arts and sciences.

The role of Washington institutions in supplying faculty to the community colleges is more crucial, but more difficult to estimate. If approximately half the number of new

community college faculty continue to be supplied by Washington institutions -- comprehensive or doctoral -- then sufficient enrollments in master's degree programs in the appropriate fields will be extremely important. It is, however, difficult to extrapolate the number of master's-level students needed in the appropriate disciplines to fulfill this need due to the number and variety of occupations and career paths master's students may follow.

However, it is clear that the two doctoral institutions should focus their efforts on expanding enrollments in doctoral-track programs at the main campuses. Doctoral education requires the substantial (and expensive) resources of the main campuses, including libraries, computers, equipment, and laboratories. Both the UW and WSU should concentrate their efforts on doctoral-track programs -- adding enrollments and degree production -- in the 20-year planning cycle ahead.

Doctoral programs at the branch campuses are specifically not allowed by HECB policy. Duplicating resources to support doctoral programs at the branch campuses would be a very costly investment of state resources in order to provide quality comparable to main campus programs. While the HECB may in the future consider a waiver of this policy, that waiver will be limited to practice-oriented doctorates that (1) have exceptional state need, (2) whose location at a branch campus provides an important advantage to the student and program, (3) can offer comparable quality to on-campus programs, and (4) can be offered with a reasonable investment of state resources. For the foreseeable future, the Board will not consider any Ph.D. offering at the branch campuses, given the level of resources required by the heavy investment in research that a quality Ph.D. program requires.

State Plan for Graduate Enrollment Growth

Several factors were considered in the preparation of the State Plan for graduate enrollment growth in Table 11. First, careful consideration was given to the institutional plans and goals. Second, the role of the state's comprehensive and doctoral institutions was considered in order to encourage a coordinated, system approach to graduate education. To that end, doctoral enrollments are emphasized at the doctoral institutions and master's enrollments at branch campuses and comprehensive institutions. Third, the relationship of each campus to economic development plans for the region was reviewed. Fourth, the development of strengths or expertise at each campus was considered. Last, each institution was compared to its peer group to check on the reasonableness of the graduate/undergraduate mix.

Taking all of these factors into account, a number of principles were identified to guide the distribution of enrollments in the State Plan, listed on the following page. These principles should also help guide the biennial allocation of future graduate enrollments.

One of the "Principles Guiding the Distribution of Graduate Enrollments" is that a reasonable balance should be maintained between graduate and undergraduate enrollments. As there is no universal agreement about what that balance should be at either a doctoral or a comprehensive institution, it seems useful to look to each institution's peer group for comparison.

Table 10 presents graduate enrollment as a percent of total enrollment at each of the public institutions compared to its peer group; the numbers for 2010 assume adoption of the enrollment figures in Table 11. For the UW, the additional graduate enrollments do not change its ranking; for WSU the graduate enrollments raise it from the bottom to the top of its peer group. Removing branch campus graduate enrollments does not change the UW ranking but raises WSU's ranking from bottom to number 7. Given the range of institutions which comprise the comprehensives' peer group, the graduate enrollments increase their ranking, but not markedly. While there is no agreement about where in this ranking Washington institutions should be, it is reasonable to assume that they would be above the average of their peers in percent of graduate enrollments, given the large number of undergraduate students in this state who are educated through the community college system.

Principles Guiding the Distribution of Graduate Enrollments

1. The size and type of graduate enrollments at an institution should be determined by the needs of the state, student demand, the institution's mission, and each program's geographic market.

2. A reasonable balance should be maintained between graduate and undergraduate enrollments, using as a benchmark the average percent of graduate enrollments among each institution's peers.

3. Enrollments should be distributed across the state to take advantage of special local resources and support coordinated community plans for economic development.

4. The majority of graduate enrollments should be located on the main campuses, with a smaller number on the branch campuses and even smaller number off-campus.

5. Whenever possible, students should be encouraged and provided the financial means to commute or relocate to a main or branch campus. Where students are truly placebound with no campus nearby, institutions are expected to offer a limited number of practice-oriented master's programs off-campus.

6. The independent institutions should be encouraged to increase graduate enrollments wherever possible, understanding that some high-cost programs are likely to remain the exclusive responsibility of the state.

7. The two research institutions should continue to have responsibility for doctoral programs and first professional degrees. Research and regional institutions should share the responsibility for research-oriented and practice-oriented master's degrees.

8. While remaining true to their primary mission of upper division and master's-level instruction, the branch campuses should develop unique identities, in response to the institution's goals, local needs and resources, and the overall needs of the state.

9. While the Ph.D. remains inappropriate for branch or off-campus programs, a very small number of selected practice-oriented doctorates should be considered for the branch campuses, if stringent need and quality criteria are met.

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Table 10
Graduates as Percent of Total Enrollment,
Washington Institutions vs. Peer Groups

	Grad as % of Total		Ranking in Peer Group		Proposed
	1990	2010	1990	2010	Range
UW	26.5%	30.0%	8	8	25-35%
WSU	15.4%	28.6%	17	1	25-35%
[Branches Removed	13.9%	21.8%	17	7]	
CWU	4.8%	10.2%	211	153	10-20%
EWU	13.5%	19.6%	110	56	10-20%
TESC	6.0%	13.9%	15	5	10-15%
WWU	8.1%	11.3%	177	137	10-20%

NOTES: (1) Based on IPEDS database for Fall 1989, not all institutions in peer groups reporting. (2) Graduate includes all post-baccalaureates, graduate students, and professional students. (3) Total enrollment assumes undergraduate enrollment growth as in enrollment plan (HECB, 1990). (4) Ranking within peer group for 2010 assumes no change in other institutions' mix of graduates to undergraduates. (5) Figures for WSU with branches removed reflect larger graduate enrollment growth in proportion to total than on the Pullman campus. (6) Not all institutions in the TESC peer group are included.

If this enrollment plan is adopted, the percent of students on each campus who are graduate or professional will clearly increase. This outcome is not surprising, though, as the state's participation rate in graduate and professional education lags significantly behind the undergraduate rate. The public universities will have to take on proportionally more graduate students if the Board's goal of the 70th percentile is to be reached.

In order to keep this proportion reasonable and still meet the statewide goal, this study proposes a percentage range for graduate and professional enrollment at each institution to be used as a guide for future enrollment and program decisions. Those proposed ranges appear in Table 10. In every case the enrollments proposed for 2010 in this plan put the institution within the desired range, though with considerable variation. It is important to note that these percentages assume that undergraduate enrollments will grow at the rate outlined in the Board's 1990 enrollment plan. If this turns out not to be the case, graduate enrollments should be adjusted to maintain an appropriate mix.

Table 11
State Plan for Graduate Enrollment Growth

	1990	1995	2000	2010	20-Year Growth #	20-Year Growth %
UW Seattle	8970	9500	10,000	11,000	2030	22.6%
Evening	--	500	1000	1500	1500	--
Bothell	--	200	600	800	800	--
Tacoma	--	300	700	1000	1000	--
Total UW	*8970*	*10,500*	*12,300*	*14,300*	*5330*	*59.4%*
WSU Pullman	2225	3000	3500	4000	1775	79.8%
Southwest	124	400	600	1000	876	706.5%
Tri-Cities	377	600	700	1000	623	165.3%
Spokane	81	400	600	1000	919	1134.6%
Total WSU	*2807*	*4400*	*5400*	*7000*	*4193*	*149.4%*
CWU	364	600	700	1000	636	174.7%
EWU	1212	1600	2100	2600	1388	114.5%
TESC	202	320	500	600	398	197.0%
WWU	572	1000	1200	1300	728	127.3%
Total Publics	14,127	18,420	22,200	26,800	12,673	89.7%
Independents	6800	8800	9800	10,800	4000	58.8%
Post-Bacc (Est.)	2000	2125	2250	2500	500	25.0%
TOTALS	**22,927**	**29,345**	**34,250**	**40,100**	**17,173**	**74.9%**

NOTES: Enrollments in Spokane total 2000 (1000 each at WSU, EWU). Reflects program additions discussed in the following section on Spokane.

The above plan provides a system approach to graduate education in the state. The main campuses of the two doctoral institutions should focus their efforts on doctoral-track programs and students, which does not exclude growth in appropriate master's programs. The branch campuses should focus on practice-oriented master's programs, with some doctoral-track master's programs as can be supported appropriately by the faculty and other resources. The comprehensive institutions should focus their efforts on practice-oriented master's programs, and increasing the number and enrollments in doctoral-track master's programs. In this way, each institution contributes to the growth and health of graduate education in the state of Washington with its own programmatic strengths and expertise.

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It is also recommended that a small portion of the state-funded graduate enrollments be applied to supporting quality off-campus programs. Each institution will continue to be called upon to serve communities in proximity to the main campus, and to provide quality applied master's programs in some fields as business, education, or nursing. This is an essential service to Washington citizens not within easy commuting distance to a main campus, and the pressure to do so will only increase.

State Plan by Field

To arrive at a state plan capturing graduate enrollment growth by field, a variety of factors were considered. First, the growth projected by the institutions was compared to the findings of the state need subcommittee. Those fields whose enrollments required adjustment upwards or downwards were reviewed at each institution offering the field of study. Second, institutional preferences to specialize their areas of expertise were carefully considered. Third, the need for enrollments in programs which are the only such program in the state (or region) was also carefully reviewed, as was the need for programs which are offered at several institutions. Fourth, an attempt was made to make enrollments in applied master's programs somewhat proportional to the region being served. Fifth, a judgment was made as to a suitable and consistent number for a new degree program; 15 was decided upon as a sensible figure for a cohort of students. Sixth, all estimates of enrollments were rounded, to capture the lack of specificity of some of these estimates. Lastly, these State Plan figures were reviewed by the individual institutions, and adjustments were made, if necessary.

Table 12 presents the State Plan for graduate enrollments by field, for the six public institutions. It presents estimated enrollments only to 2000, given the difficulty and tenuousness of projecting beyond the year 2000. Over the initial 10-year planning period, large enrollment growth is projected to occur in the social sciences and sciences, business and related management programs, and engineering. Education will experience the greatest increase which is largely in response to teachers' need for master's degrees. Moderate growth will occur in the arts and humanities, nursing and allied health. These growth figures mirror the growth indicated in the professional fields named, and also the growing need for individuals trained in the arts and sciences, for faculty and other careers.

These estimates of enrollments by field are based on recent information about occupations, the economy, and changing occupational requirements. It is urged that these plans be revised on a regular basis so that graduate enrollments may be adjusted to accommodate future changes in these factors. In addition, institutions will need to be allowed some flexibility to respond to changing conditions in the interim period between plans -- such as a modification of accreditation standards or an increase (or decrease) in an occupation's qualifications due to technological innovation.

Appendix C presents the State Plan graduate enrollments by field for each public institution.

All of the projections included in the State Plan presume sufficient state resources to support additional graduate FTEs. A consistent problem in the past has been the allocation of funding at average cost-per-FTE rates (or a marginal cost-per-FTE rate). As all six public institutions are, and will continue to remain predominantly undergraduate institutions, the average cost is often insufficient to support graduate enrollments. Thus, it will be important to fund graduate enrollments at an enhanced rate. This will mean that the state will clearly need to put substantial resources into supporting this enrollment growth.

Table 12
State Plan
Enrollment Growth by Field

	1990	1995	2000	10-Year Change #
Arts & Sciences				
Arts	445	520	590	145
Humanities	888	1070	1180	292
Social Sciences	1500	2075	2470	970
Sciences	1605	2310	2825	1220
Professional Fields				
Business & Mgt.	844	1330	1840	996
Education	1934	3170	4055	2121
Public Adm. & Plan.	417	450	515	98
Social Work	454	490	530	76
Library Sci.	176	185	195	19
Legal Studies	36	35	35	-1
Family/Other	52	55	100	48
Architecture	219	280	290	71
Engin. & Tech.	1544	2015	2540	996
Forestry	177	185	195	18
Fisheries	311	320	330	19
Agriculture	155	165	210	55
Nursing	343	445	580	237
Allied Health	262	460	635	373
Public Health	302	345	385	83
Medicine	233	290	345	112
Dentistry	59	60	60	1
Pharm. Sci.	103	115	125	22
Vet. Sci.	67	90	105	38
Interdisciplinary	219	265	370	151
Other (Unclassified)	153	80	80	-73
First Professional				
J.D.	463	450	450	-13
M.D.	644	645	645	1
D.D.S.	204	200	200	-4
D.V.M.	305	305	305	0
Pharm.D.	13	15	15	2
TOTALS	14,127	18,420	22,200	8073

What should be the state's plan for expansion of graduate enrollments?

Summary

- The public institutions will accommodate an approximate graduate enrollment of 12,673 students, or 89.7% growth from 1990 to 2010. Achieving this enrollment goal will be dependent upon receiving full-FTE funding.
- The independent institutions will accommodate an approximate graduate enrollment growth of 4000 students, or 58.8% growth.
- Enrollments are planned in fields which approximate state need recommendations.

What should be the state's plan for expansion of graduate enrollments?

Recommendations

- The State Plan provides a system approach to graduate education, with the two doctoral institutions focusing on doctoral-track students, their branch campuses and the comprehensive institutions focusing on master's programs.
- The HECB should update the guidelines for Off-Campus or Reduced Residency Doctoral Programs in Washington.
- Comprehensive institutions should focus on developing and maintaining high-quality research- and practice-oriented master's degree programs.
- An institution may allocate a small portion of its state-funded graduate enrollments to support quality off-campus programs.
- Increased graduate enrollments should be supported at the full cost-per-FTE rate.

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VI. How should the needs of Spokane be met?

Spokane is home to four higher educational institutions that offer a range of graduate programs. Two private institutions -- Gonzaga University and Whitworth College -- and two public institutions -- Eastern Washington University and Washington State University -- serve the Spokane community and the eastern Washington region. The report of the Spokane subcommittee (see Technical Appendix C) reviewed existing occupational projections for the Spokane community and eastern Washington as well as economic development publications to assess the needs for graduate programs.

The four institutions were also asked to share their plans for continuing and new Spokane-based graduate programs, and discussions were held on shared areas of concern and potential areas for collaborative programs. While differences continue to exist, the following discussion attempts to represent a judicious consideration of all institutions' points of view, the goals and aspirations of the Spokane community, and the best and most cost-effective use of state resources.

Principles Supporting Spokane Plan

Collaboration -- Wherever possible, collaboration between or among institutions on program planning and delivery is expected. Collaboration among institutions can provide several benefits to Spokane and the state. It allows institutions to mount programs which might be too costly or too risky if offered by one institution alone. Sharing resources is cost-effective, and prevents the duplication of resources or programs which are a drain on the institution or state. Successful experiences with collaborative programs build a philosophy of mutual trust and interest, a commonality of purpose. Collaboration is not easy, and takes time to develop common goals and program philosophy. It must become a commitment, akin to the commitment to quality and equality, among faculty, administrators, and the public.

Duplication -- Within Appendix C to the state's Master Plan (HECB, 1987) is a provision allowing for duplication of programs if warranted by the needs of Spokane. Duplication would need to be justified to and approved by the HECB. As the Spokane subcommittee reviewed the needs of Spokane and the region (see Technical Appendix C), it became clear that sufficient documented need existed for duplication of programs in a few areas, e.g., master's degrees for teachers and computer science. The potential for duplicated programs in other areas may well exist, but sufficient documentation of need was not available at the time. However, any discussion of duplicated programs would also need to incorporate an understanding of the market served by similar programs at the independent institutions, as has been outlined in a previous section.

Economic Development -- The Spokane community has targeted several areas for economic development, either to retain existing firms or recruit new firms to the area.

Degree programs which might serve as a catalyst for future economic development should be a part of the area's economic development plan, which reflects an organized and coordinated effort to develop a particular segment of the business community in Spokane. However, such degree programs should also fulfill a need in the region or the state. Other issues -- such as the level of available resources and the importance of competing educational needs -- may temper planning and development of programs intended to support economic development initiatives.

Contributions of the Independent Institutions -- The current role of Spokane's two independent institutions -- Gonzaga University and Whitworth College -- should continue to be recognized. Their present and potential contributions to higher education in the region should be incorporated throughout the program planning process, to include needs assessments, collaborative planning (if appropriate), and development.

Appendix C -- The "Guidelines for Service to Spokane" outlined in Appendix C of the 1987 Master Plan should be modified to reflect a program-level assignment of responsibility. The program responsibilities which appear in the following section are consistent with this approach and reflect each institution's plan for graduate program offerings in Spokane. These assignments are intended to describe general program areas appropriate for each public institution to develop, not to identify every possible or planned degree program. It will be important to revisit these assignments as needs change over time.

Program Responsibilities

Eastern Washington University -- Graduate programs offered by EWU provide an important service to Spokane and the surrounding area. New degree programs should be consistent with Eastern's role and mission, existing strengths, and institutional goals. Generally, the location of its different types of graduate programs should be governed by what is appropriate for the program.

- EWU should locate the majority of its professional programs in Spokane (e.g., business, social work) where faculty and resources are closer to students and the program's service public.

- Research-oriented master's programs should remain on the Cheney campus where resources have already been developed to support these programs.

- Practice-oriented master's programs (e.g., education, applied psychology) not incorporated in the preceding recommendation on professional programs should be located based on accessibility to existing resources, student population, and clinical settings.

Washington State University -- Graduate programs offered by WSU will serve an important function in the educational needs of Spokane and the region. Programs should be developed to complement existing programs offered in the area, enhance the educational opportunities of professionals, and provide unique degree programs which only a doctoral institution may offer. Generally, there are five different types of graduate programs which should be offered in Spokane by WSU:

- Practice-oriented master's programs in areas a) where sufficient need for duplication can be documented or b) where WSU can offer similar, but unique, curricular options (e.g., thesis-required master's degrees for teachers, theoretical computer science, specialized management degrees).

- Practice-oriented master's programs in areas where collaboration between or among institutions can maximize resources (e.g., public administration, health care administration, educational administration).

- Practice-oriented master's programs in science and technical areas, applied technology fields, and areas where WSU has sole statewide authority (e.g., agriculture and home economics) or no duplication exists, in addition to the engineering programs already in place.

- Research-oriented master's programs in the basic sciences in the later years of this plan (2000 to 2010). It is recognized that it will be expensive to duplicate necessary science facilities and equipment, hire resident faculty, and create sufficient student demand to support these programs. However, the state's need for individuals with graduate degrees in the sciences and Spokane's economic development efforts support an attempt to provide these types of programs at WSU-Spokane.

WSU-Spokane should expect to serve a regional student body who may relocate to Spokane for their graduate studies if the degree program is unique to Spokane. Programs that are extensions of Pullman-based programs should expect to serve the placebound population of Spokane county.

Joint Center for Higher Education

As has been described in House Bill 2198, the Joint Center will coordinate the programs and activities of the higher education institutions in Spokane, more particularly joint programs and contractual negotiations between public and independent institutions. The Joint Center is also charged with coordinating the programs and activities of SIRTI and with developing, in cooperation with participating institutions, a master plan for the Spokane Higher Education Park. Final approval of all degree programs, the construction

of the SIRTI facility, and the master plan will be the responsibility of the HECB, based on recommendations of the Joint Center.

To support its expanded responsibilities, the Joint Center will be expanded to 12 members (one member of the governing board of each public institution, the three presidents or CEO of the public institutions, and six citizens of Spokane county), plus three non-voting members (the presidents of the independent institutions and the Executive Director of the HECB). Nine board members will be appointed by the Governor for four-year terms. The Center's functions will be funded through a direct state appropriation.

SIRTI

As a part of its planning, the Spokane subcommittee reviewed the graduate degree programs which could provide a nucleus and foundation for SIRTI activities. In fact, developing ties with degree programs is but one function of the SIRTI concept. SIRTI may be most effective when it connects the research and development interests of local industry with the intellectual resources of the universities. SIRTI projects need not be limited to Spokane-based faculty, but should draw upon the expertise of faculty and graduate students in any of the cooperating institutions, housed on the main campuses of Eastern or WSU, or at the independent institutions. While degree programs can make a contribution to SIRTI, they are not essential to achieving all of SIRTI's objectives.

Several degree programs already offered by cooperating institutions (e.g., engineering, computer science) can provide the resident faculty and graduate students that will stimulate and perform SIRTI research and development projects in such areas as engineering and manufacturing. As new degree programs are considered for Spokane, or new research and development interests are identified within the Spokane business community, new areas of expertise may develop.

How should the needs of Spokane be met?

Recommendations

- Collaboration between and among higher education institutions is required.
- Duplication of programs is not allowed, unless warranted by the needs of Spokane and documented for review and approval by the JCHE and the HECB.
- Degree programs which might serve as a catalyst for economic development should be a part of a coordinated economic development plan for the area and be needed on a regional or statewide basis.
- The independent institutions should be involved in program planning and delivery for Spokane.
- Program Responsibilities for Eastern Washington University:
  - Most professional programs should be offered in Spokane.
  - Research-oriented master's programs should be located at Cheney.
  - Practice-oriented master's programs should be located based on accessibility and resources.
- Program Responsibilities for Washington State University in Spokane:
  - Upper-division courses leading to a baccalaureate degree in areas for which WSU has sole statewide authority.
  - Practice-oriented master's programs where collaboration between or among institutions is appropriate or where sufficient need for duplication can be documented.

- Practice-oriented master's programs in science, technical, and applied technology areas, areas where WSU has sole statewide authority or no program duplication will exist.
- Research-oriented master's programs in the sciences should be planned for the years 2000 to 2010.

- WSU-Spokane should plan to serve a regional student body who relocate to Spokane if the graduate program is unique to Spokane.

- As directed by the 1991 Legislature, the Joint Center for Higher Education is responsible for coordination of higher education programs and activities in Spokane, including the Spokane Intercollegiate Research and Technology Institute (SIRTI), and for development of a master plan for the Spokane Higher Education Park.

- Appendix C to the Master Plan (HECB, 1987) should be modified and approved by the HECB to incorporate a program-level assignment of responsibility. The intent should not be to identify every possible program, and the list should be revisited as needs change.

- Final approval of all degree programs, SIRTI, and the master plan is the responsibility of the HECB, based on recommendations forwarded by the Joint Center.

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VII. What financial policies will be needed to encourage graduate enrollment growth and maintain program quality?

Graduate enrollment growth of the magnitude and diversity planned for in this document will require a large investment of the state's resources. An estimate of that investment, and other financial policies, is abstracted from the financial subcommittee report (the full document appears in Technical Appendix D). The goal, to enroll graduate students at the 70th percentile nationally, would require an approximate doubling (21,000 to 40,000) in the number of graduate students to be served by the state's public and independent institutions. Achieving that goal will require changes to the state's financial policies -- tuition, student support, facilities -- to enhance enrollments and ensure continued quality in graduate programs.

Tailor Support to Meet Different Needs

Graduate education is spoken of as if it were one entity, similar in characteristics (and needs) across disciplines, programs, places, and people. However, it is probably more appropriate to speak of it as a collection of academic enterprises held together by a common designation as graduate education. That is, of course, a simplification, which hides important differences which affect the financial support of graduate education and graduate students. Therefore, the present plan is not a blanket request, demanding more resources for everything. With some precision, we are able to outline what types and levels of financial support might be most effective in increasing the quality of graduate education as well as meeting the state's long-term enrollment goal. The state and institutions should be able to tailor support to make the best use of state and institutional resources. However, these distinctions will need to be monitored, and financial policies adjusted to reflect changes that occur.

Disciplinary Differences -- Student support opportunities vary widely from discipline to discipline. Some disciplines enjoy a relatively large number of Teaching Assistant (TA) positions, since the department has an obligation to undergraduate instruction. English, Mathematics, and Chemistry are examples of these disciplines. Some graduate students can find support in these disciplines, but clearly not all do so. In disciplines which receive externally-funded research and training support, graduate students can find Research Assistant (RA) and a few fellowship positions. At present, departments in the sciences and other technical fields are relatively "richer" in student support options. Lastly, there are those disciplines -- education, arts, and some humanities -- which receive very little student support monies, either in the form of TA positions or grant-funded RA positions.

Master's versus the Doctoral Track -- There traditionally has been little, if any, graduate student support for individuals pursuing practice-oriented master's degrees, e.g., education, business, public administration, engineering. Individuals in these programs are likely to pursue the master's degree for professional development and career

advancement reasons. They are more likely to attend part-time, continuing to work to help pay for their education or choosing to work to enhance their careers. Degree programs are often designed to be offered on a part-time basis, and the quality of the program may actually be enhanced as coursework proceeds hand-in-hand with work applications.

Individuals in doctoral-track programs -- the research master's and doctorate -- are more likely to seek some sort of student support so that they may attend graduate school full time. Doctoral programs require several years of continuous full-time residence, and thus financial support to enable students to fulfill this requirement is essential. Student support -- TA, RA, and fellowship positions -- is essential to these students for three reasons. First, working full time would further delay the student's completion of an already-lengthy program of study. Second, in some fields, educational quality is enhanced if students can immerse themselves in the material and interact extensively with faculty. Third, 40% of the students pursuing the doctorate intend to join the professoriate, and therefore the opportunity to teach, advise students, and conduct research is essential to achieving their career goals. These are apprentice positions, and necessary to ensure that new faculty have the skills to do their jobs well.

Recruitment Packages -- Clearly, graduate programs benefit when the best students are recruited. Institutional reputations are enhanced by the quality of their graduates, faculty are stimulated by the best graduate students, fellow students benefit from bright classmates, and undergraduates are intellectually challenged by capable TAs. In fact, for many faculty, the quality of graduate students is the second most important factor in deciding to take a position -- or remain on the faculty -- at institutions offering graduate programs. However, recruiting the best requires competing with other universities, which is becoming increasingly difficult. For example, other states which have funded minority graduate students can offer multi-year packages, assistance with moving costs, and a competitive stipend. Washington institutions have found that all too often they have lost the competition for bright minority students -- some of whom have been Washington residents.

Increasingly, the brightest graduate students "shop" for the best recruitment package. They are not influenced by the offer of a tuition waiver, or a TA position, or a stipend; almost all institutions offer those. Instead, they look for the best "package," or combination of support mechanisms. While it is not suggested that Washington enter the bidding war for each and every bright graduate student, the state should be able to offer competitive recruiting packages to its own residents who are being recruited by out-of-state institutions, minority students, and a selection of the best and brightest from the nation and the world.

Differences among Campuses and Institutional Missions -- It is tempting to categorize graduate education by its location or institutional mission. However, on closer inspection, the programs and graduate student clientele of each university may be

affected by a variety of factors and may, over time, take on a very distinctive character. For instance, graduate students in Pullman and Seattle face different employment opportunities, which explains many differences between the two student populations. Students in Seattle may attend part-time and choose to work elsewhere; Pullman students must rely on university employment or financial aid for support.

The comprehensive institutions are perceived to offer only practice-oriented master's programs in applied areas, while the doctoral institutions seem to be identified with doctoral-track programs. While this may be useful as a generalization, the comprehensives do offer research-oriented master's programs and the doctoral institutions offer many practice-oriented master's programs. Therefore, while it may be true that doctoral students are found only at the doctoral institutions, doctoral-track students may be found in master's degree programs anywhere in the state.

Differences in How Graduate Education Is Financed -- Graduate students face the problem of funding the two primary costs of attending graduate school: tuition and the daily costs of living. The latter includes: 1) paying rent, electricity, and phone bills; 2) buying food, clothing, health insurance, and transportation; and 3) buying books, notebooks, and (increasingly) computer supplies. These are not inconsequential costs, and they can be exacerbated by the local community's cost-of-living and the lack of part-time employment. In addition, many graduate students are paying living expenses not only for themselves, but their families.

Graduate students differ in how they finance their educations. Recipients of doctoral degrees in 1988 from the UW were asked to indicate the "primary" source of support and a "secondary" source of funding; this same question was asked of 1990 master's students at Western to allow for comparisons between types of students and institutions. Doctoral students at the UW depend primarily on university employment (see Table 13), but they have also turned to other employment, savings, and spousal support. Documentation that graduate students have increasingly turned to loans to finance a portion of their educations is also evident. Western Washington University students rely to a larger extent on their own and family resources, student loans, and employer reimbursement programs. Fewer WWU students receive assistance through university sources, be they state or federally funded. This comparison captures differences between funding available to graduate students in master's versus doctoral programs and to a comprehensive versus doctoral institution.

Table 13
Primary and Secondary Sources of Funding

Source	University of Washington #	University of Washington %	Western Washington University #	Western Washington University %
Primary				
Own/Family	92	30	79	29
University*	158	52	74	24
Federal**	36	12	22	9
Non-Federal***	1	0	6	2
Student Loans	4	1	34	11
Other/Employer	16	5	67	25
TOTAL	307	100	282	100
Secondary				
Own/Family	90	34	109	54
University*	112	42	22	10
Federal**	34	13	15	7
Non-Federal***	5	2	6	1
Student Loans	23	9	39	17
Other/Employer	3	0	24	10
TOTAL	267	100	215	100

** Includes TA, RA, fellowship, work-study.*
*** Includes NIH, HHS, NSF, FLAS, Veteran's, other federal, but not RA positions (which are predominantly funded by federal and other grants).*
**** Includes independent/foundation fellowship.*
SOURCE: UW Graduate School (1989).

Graduate Students

Clearly, graduate students are not cut from one cloth. Their need for financial support is different based on their academic discipline, career goals, and employment status. They may also be financially affected by their resident status or whether they have a family to support or are from an underrepresented population.

Resident Students -- Significant attention has been paid to non-resident/foreign graduate students in the national press. However, the state and its four-year institutions will continue to stress service to Washington State residents in graduate programs. In many ways, the institutions with a regional mission and the responsibility for applied master's programs already concentrate their efforts at recruiting and graduating residents within the state (see Table 14). The institutions with statewide missions and branch campus responsibilities concentrate on serving Washington residents in their applied master's programs at main and branch campus locations. But they must also recruit the

best and most able residents into doctoral-track programs. Therefore, it is clear that Washington residents are served in a variety of settings, and expanding enrollments at all of the institutions will ensure that Washington residents increase their participation in graduate education.

With the establishment of the five branch campuses and increased efforts at providing off-campus degree programs, the special needs of the placebound, working adult must be considered. Almost by definition, the working adult will be attending graduate school part-time, and thus changes in part-time tuition will be important. The cost of tuition is also important, however, and further study might indicate that waivers will be needed to encourage increased graduate enrollment of the low-income working adult, the adult with a family to support, the young teacher pursuing a master's degree for certification, or the single parent trying to work and attend graduate school at the same time. The present practice of requiring that all tuition be paid early in the term is also difficult for many graduate students, more particularly those with low-paying jobs, on stipends, or with little savings. In effect, this inflexibility has forced many graduate students to take out loans to pay tuition bills. The state should consider allowing students to pay their tuition through flexible payment schedules throughout a term.

Increasingly, the graduate student of tomorrow will be older than the traditional student, who entered graduate school immediately upon completing the baccalaureate degree. The non-traditional graduate student is returning to school after several years in the workplace, with financial obligations of mortgage, student loans, and children. Increasingly, the graduate student is a single parent, so it is not surprising to find that this student requests appropriate student services. Many campuses have seen a rise in student activism as it relates to health insurance and related benefits, child care opportunities, and housing. Both of the state's doctoral universities have experienced difficulty recently in finding and keeping married student/family housing. The pressure on the UW and WSU to address the housing supply for graduate students is especially severe, and planning should begin immediately to consider a variety of funding sources and the exploration of creative solutions to the establishment and growth of these services.

Minority/Underrepresented Populations -- Increasing the representation of students from underrepresented populations (e.g., minorities, disabled, women in science) in graduate programs presents several financial difficulties. First, when these students are especially gifted, they may also be heavily recruited by other universities, which may offer them a "recruitment package" that Washington institutions cannot at present match. Second, many qualified potential graduate students will require financial support to enroll in a graduate program and continue to graduation. Attrition studies of minority graduate students highlight the importance of financial support, though finances are by no means the only cause of dropping out.

Non-Resident Graduate Students -- Graduate students are classified as non-residents if they are not Washington State residents. Non-residents, therefore, are both "domestic" (i.e., U.S. residents) and "foreign or international" students. Both groups of non-residents provide a variety of benefits to the graduate enterprise. First, they contribute to the diversity of the student population, adding representatives of other nations, ethnic heritages and languages, racial and cultural backgrounds, and academic preparations. Second, they may improve the academic quality of the graduate program, adding students with expertise not available in Washington State. For example, students from states outside Washington bring a knowledge of the geology of another region, the governmental structure of a different state, or the environmental policies of a different region. Third, foreign and international students help teach Washington State residents about other nations, their culture and traditions, languages and values. This personal exposure to different nationalities is essential to helping Washington internationalize its economy successfully. Fourth, non-resident graduate students stay in Washington State at a higher rate than occurs in other states. They bring their talent and brains to the state and stay to make their own unique contributions.

An on-going concern, of course, is that non-resident graduate students are displacing Washington residents in graduate programs. Table 14 provides the figures of residents and non-residents enrolled in the public institutions. The low percent (13.2%) of non-resident foreign graduate students may be one indicator of the public institutions' dedication to serve Washington residents as their first priority.

Table 14

Fall 1989 Graduate and Professional Student Headcount Enrollment, by Residency Status

	Washington Residents		Other US Residents		Non-Resident/ Foreign		Total
	#	%	#	%	#	%	#
UW	5256	60.8	2250	26.0	1144	13.2	8650
WSU*	1266	53.9	630	26.8	453	19.3	2349
CWU	298	89.5	21	6.3	14	4.2	333
EWU	509	80.5	102	16.1	21	3.3	632
TESC	145	91.2	12	7.5	2	1.3	159
WWU	457	81.8	56	10.0	46	8.2	559
TOTALS	7931	62.5	3071	24.2	1680	13.2	12,682

** Includes branch campuses.*
SOURCE: HEER (OFM).

Clearly, hidden in these numbers are very different experiences by discipline. For example, at the UW the proportion of non-residents in engineering graduate programs is 48%, but non-residents in education graduate programs comprise only 11%. These differences reflect the national experience.

The state should recognize the unique contributions of non-resident graduate students, both to the institution and the state. The state presently charges high non-resident graduate tuition to create a financial barrier to attendance at Washington institutions. Not surprisingly, the majority of non-resident graduate students receive a tuition waiver of the difference between non-resident and resident rates or they could not attend. Without this assistance, the vast majority of these individuals could not attend graduate school in Washington State nor make their unique contributions to the graduate enterprise.

Part-time vs. Full-time Students -- For a variety of reasons, many graduate students attend part-time. Their jobs, family obligations, or monetary limitations constrain their coursetaking and delay their earning of a degree. A part-time graduate student is not necessarily assumed to receive a lesser quality education, since many professionals can learn new skills, apply them to their work situations, and have both their education and their job performance benefit. In Washington State, the proportion of graduate students who attend full time (9 credits or more) at the public institutions remains fairly high (69% in 1990). However, the proportion of full-time students at the private institutions mirrors the experience at the national level, where full-time students are clearly in the minority (see Table 15).

Table 15

Part-time vs. Full-time Students – Washington vs. Nation

	Washington				Nation			
	Part-time		Full-time		Part-time		Full-time	
	#	%	#	%	#	%	#	%
Public Institutions								
1986	4113	33%	8195	67%	602,891	64%	338,376	36%
1987	4065	33%	8326	67%	607,805	64%	336,824	36%
1988	4106	32%	8577	68%	593,911	63%	354,782	37%
1989	3328	29%	8066	71%			N.A.	
1990	3775	31%	8489	69%			N.A.	
Private Institutions								
1986	3710	74%	1302	26%	310,484	63%	183,537	37%
1987	3985	73%	1495	27%	317,541	63%	189,905	37%
1988	4767	80%	1213	20%	325,455	62%	197,714	38%
1989	4980	82%	1113	18%			N.A.	
1990	6171	83%	1224	17%			N.A.	

NOTES: (1) Fall headcount enrollment; (2) full-time: 9 or more credit hours.
SOURCES: Washington data from IPEDS; National data from NCES (1990).

Part-time enrollment is expected to increase in Washington public institutions. First, graduate programs at the branch campuses and in other urban areas will likely be attractive to employed individuals who wish to pursue a graduate degree part-time. Second, part-time enrollment is more attractive in those professional fields (e.g., business, education, engineering) where students are likely to have full-time employment or who are pursuing the graduate degree for professional development reasons. It is also probable that the enrollment lids at the public institutions have acted to discourage individuals who would prefer to attend part time or during the evenings.

Tuition Policy

Tuition Levels -- It is clear that Washington's graduate tuition has climbed to levels that are higher than the average of the institutions' peer groups (Table 16). The state's rank, in relationship to other states and the institutions' respective peer groups, also indicates that resident and non-resident graduate tuition rates have risen to comparatively high levels.

Table 16
Washington 1990-91 Graduate Tuition vs. Institutions' Peer Groups

	Rate	Peer Ave.	% of Peer Ave.	Rank Among Peers
University of Washington				
Resident Graduate	$3,033	$2,827	+7.3	9
Non-resident Grad.	$7,578	$7,139	+6.1	12
Washington State University				
Resident Graduate	$3,033	$2,506	+21.0	7
Non-resident Grad.	$7,578	$5,908	+28.3	5
Comprehensives/TESC				
Resident Graduate	$2,604	$1,885	+38.1	7
Non-resident Grad.	$7,899	$4,452	+77.4	1

Source: HECB (1991).

Costs for graduate education will always be high, as it is an extremely labor-intensive enterprise, depending upon highly-qualified and educated individuals to deliver the educational product. Producing individuals with master's and doctoral degrees is time-consuming, as graduate students require significant faculty time in the lab, with advising, or providing thesis/research assistance. Graduate study also requires the latest equipment to keep up with current scientific methods and instruction. It is likely that costs

will continue to increase, despite efforts at improved productivity (lowering the time-to-degree) and cost-containment.

Future Tuition Policy -- Tuition is one of the two primary costs of education to the graduate student. Even as it provides revenue to the state to partially offset the cost of providing a graduate education, tuition levels play an important role in the decision to pursue a graduate degree. Ever-higher tuition levels will certainly impede the state's ability to achieve the HECB's goal of increasing graduate enrollment. Most evidence to support this point of view, however, is anecdotal. The response of the skeptic is to question the negative impact of higher tuition levels on attendance, citing the full enrollment at the public institutions. This argument masks the effect of the enrollment lids, as the lids create an artificial and constrained market, thereby limiting the opportunity for graduate education to those who can afford it.

The HECB should continue to review tuition policy as it affects all students: undergraduates, graduates, and professionals. The suggestions of the financial subcommittee for restructuring tuition will be carefully considered by HECB staff as the case for a change in tuition calculations is reviewed. However, without data to support the need for such a change, proposals for tuition changes will be ineffective. It is therefore proposed that the institutions and the HECB collaborate in an effort to survey potential or prospective graduate students and identify the extent to which, as space becomes available, tuition is a barrier to graduate attendance.

Part-time Tuition -- At the present time, graduate students pay a penalty for part-time attendance. Assuming that 10 credits is a full-time graduate load, tuition has been set higher on a per-credit basis for students attending part-time. This policy should be rectified for two reasons. The practice of penalizing part-time students is inequitable, since the price penalty is inflicted on the student who is least likely to receive financial support (part-time students do not qualify for many financial support programs). Also, since the number of part-time students will undoubtedly increase, and part-time attendance will continue to be attractive to many graduate students, the penalty of higher tuition rates may act as a deterrent to students and therefore to the state's enrollment goal. Part-time tuition should be calculated on a proportional per-credit basis, assuming 10 credits as a full-time graduate load.

Summer Tuition -- The Legislature has directed the public four-year institutions to make their summer sessions self-supporting, with the intent that tuition charges cover the costs of summer instruction. Each university has adopted a different approach to setting summer tuition, and Table 17 shows the academic year and summer rates for 1989-90. Clearly, this information belies the widespread impression that summer rates are higher than academic year rates. Most institutions have kept summer rates equivalent to -- or less than -- academic year rates. Thus, summer tuition does not appear to be a deterrent to graduate enrollment.

Table 17

Graduate Tuition and Fee Rates, Summer 1990 vs. Academic Year 1989-90

	Summer Rate	Academic Year Rate
Univ. of Washington		
Part-time (2-credit minimum)	$187	variable
Full-time (6+ credits)	$647	$867
Washington State Univ.		
Per (semester) credit hour	$125	$142
Full-time (10+ credits)	$1250	$1419
Central Washington Univ.		
Per credit hour	$70	$82
Full-time (10+ credits)	$700	$819
Eastern Washington Univ.		
Per credit hour	$71	$82
Full-time (10+ credits)	$710	$819
Western Washington Univ.		
Per credit hour	$100	$82
Full-time (10+ credits)	$1000	$819
The Evergreen State College		
Per credit hour	$81.90	$81.90
Full-time (10+ credits)	$819	$819

NOTES: (1) Western has changed its summer-term tuition to be proportional to academic-year rates. (2) Tuition increases made annually are implemented summer quarter at the UW.

Tuition Waivers

Recently, the HECB conducted a review and analysis of the tuition and fee waiver programs currently authorized by the state of Washington (HECB, 1991). Many of these waiver programs are not available to graduate students, and provide no assistance to the state's goal of improved graduate participation. For example, approximately 35 waiver programs exist (programs counted separately if they benefit different populations), but only half of these are available to graduate students. However, one waiver -- the GSA waiver -- comprises 27.3% of the total amount waived. This waiver is critical to graduate education.

Waiver programs fulfill a variety of state policies. Of course, the most important of these is the state's provision of support to academically able students who cannot pay full tuition. Graduate students are perceived by many not to be needy. The perception

is that many attend on tuition reimbursement programs from their employers, or that they can afford tuition due to their (future) higher salaries, or that they will get a TA position from the university. Table 13 reveals that a large proportion of students are not covered by employer reimbursement programs. Others are preparing for professional fields which do not earn particularly high salaries (e.g., social work), and still others are training in fields without TA positions available.

The federal Title IV definition of "need" to be applied to financial aid calculations states that students considered to be independent from their parents may qualify as needy. Since most graduate students have separated from home and are living, and supporting themselves, without assistance from their families, many comply with the federal definition of financial need. In addition, need may even apply to those graduate students lucky enough to get one of the few TA positions. To assume graduate students are not "financially needy" because they are earning $6,000 to $9,000 over a 9-month period as a TA ignores cost-of-living indices. The normal dichotomy between programs "based on need" and those based on other criteria has created a false impression that most graduate students are not needy. *The concept of financial need must be accurately applied to graduate students, the majority of whom are independent from their family of origin, and are unable to pay tuition due to unavailability of tuition reimbursement programs by the employer, present income levels, or future income levels.*

Waivers in Lieu of Compensation for Graduate Service Appointees (GSA) -- In the original 1984 legislation establishing the GSA Waiver (RCW 28B.15.615), the stipend level of the GSA recipient was lowered by the amount of the tuition waiver. Before 1984, the GSA assumably paid his/her tuition from the stipend amount, demonstrating that the GSA's total compensation was intended to cover tuition as well as daily support costs. The state was obligated to help the GSA pay tuition, though the money came in one form (stipend) rather than another (waiver). The movement from stipend to waiver had several distinct advantages for the student:

1) the waiver was not subject to income tax, while the same amount, provided as a stipend, would be taxable;

2) the waiver would increase at the same time and rate as tuition, while the stipend may, or may not, have increased with tuition; and

3) the payment of tuition via the tuition waiver was considered a part of the compensation package to the GSA whose valuable service to the institution was thereby recognized.

Throughout the country, GSAs remain one of higher education's most cost-effective investments because they deliver a valuable service to undergraduate education and the research enterprise at relatively low cost. The GSA receives compensation in terms of a stipend (or salary) and a waiving of tuition and fees, with the waiver of fees being a

necessary enhancement of a rather modest stipend amount. The GSA waiver is thus compensation for services performed, not a gift or a grant.

4% Waiver Program -- The public universities are authorized to waive 4% of their tuition and fees calculated on resident (non-waived) fees. Three-quarters of these funds (or 3%) are limited in statute to financially needy students who are also residents of the state of Washington. One-quarter (or 1%) of the tuition and fees at each institution can be waived for a variety of discretionary purposes, which can include non-resident graduate students and students who may not comply with the "need" definition used for the 3% waivers. Use of these monies can include, but is not limited to, providing waivers for groups targeted by enrollment plans (e.g., minorities, women), to correct inequitable situations, or to meet institutional goals. At present, individual universities make their own policies on how the 4% waiver money is split between undergraduate and graduate students. Table 18 lists the dollar amounts and number of waivers allocated to graduate students by the six public institutions.

Table 18
4% Waiver Monies

	--Undergraduate Students-- Headcount		Total Waived	--Graduate/Professional Students-- Headcount		Total Waived
	Non-Res.	Res.	Revenue	Non-Res.	Res.	Revenue
UW	0	1227	$1,665,574	24	316	$1,084,774
WSU	50	880	$1,113,647	8	83	$ 212,967
CWU	12	345	$ 396,796	4	0	$ 16,748
EWU	11	205	$ 358,854	2	46	$ 122,431
TESC	2	116	$ 185,265	0	2	$ 4,686
WWU	10	748	$ 576,555	0	38	$ 33,000
TOTALS	85	3521	$4,296,691	38	485	$1,474,606

SOURCE: HECB Tuition and Fee Waiver Study (data supplied by institutions).

The use of these waiver monies illuminates four difficulties. First, there is strong feeling among some that these monies ought to go predominantly to undergraduate students, where need is felt to be strongest. The figures in Table 18 capture this preference for undergraduates, where 87.3% of the total number of students receiving waivers are undergraduates. Second, a stringent definition of need (i.e., having applied for financial aid) may be eliminating graduate students who comply with the broader definition of need addressed above. Third, the tug-of-war between undergraduate and graduate students accentuates the lack of resources for either group, let alone both together. Fourth, while the decision on how to best use the 4% monies should stay with

the individual universities, graduate students should not be eliminated from use of these funds. The public universities are requested to consider allocating use of the 3% need-based waiver monies and the 1% discretionary waiver monies to graduate students more broadly than is currently the case.

TA/RA Positions

The Future Faculty -- Many Teaching Assistants (TAs) are doctoral-track graduate students who will, for the most part, be the state and nation's faculty in the future. TAs are faculty-apprentices, improving and perfecting their teaching skills, learning how best to advise students, and learning the various service obligations of faculty within departments, colleges, and the university community. TAs provide a largely unheralded service to the institution through their teaching of undergraduates, one which requires effort in preparing classes well, out-of-class advising and tutoring, and the grading of exams and papers.

Institutions continue to train TAs in instructional techniques to improve the quality of undergraduate education. TAs must demonstrate English language proficiency, are required to be evaluated by their students, and must also be evaluated by the department. TAs can help to lower the faculty/student ratio, improve the quality of instruction as they answer student questions, allow more frequent grading and use of writing assignments, and increase the personal attention and interactions with undergraduates. TAs often free faculty to concentrate on the course curriculum and other duties.

Research Assistants (RA) are also improving their future professional skills as faculty members. They contribute to faculty research and assist the institution to compete for external grants and contracts. They often guide undergraduates working on the same research and instruct them in safe handling of materials, research techniques, and the relationship of individual experiments to larger scientific issues.

The number of TA and RA positions is fewer than many might suspect. Indeed, as Table 19 shows, only 15.6% of the state's graduate students are serving as TAs and only 13.5% serve as RAs. These figures correct the impression that most graduate students are being supported through these mechanisms, though the percent is obviously much higher at the two doctoral institutions.

Compared to the average of its peer institutions, the UW has fewer TA FTEs but more RA FTEs; exactly the opposite situation is true for WSU, where there are more TAs but fewer RAs (UW, 1989; Burkett & Smith, 1989). While every institution has expressed interest in increasing the number of TA positions, public universities already have a variety of means available to them to do so. They include using work/study funds, appropriated

enhancement monies, or the reallocation of faculty positions. The proper mix between teaching assistant and faculty positions is best left to each institution.

Table 19
Fall 1989 TA and RA Positions

	UW	WSU	CWU	EWU	TESC	WWU	Totals
Total Grad/Prof Students	8650	1847	334	1109	159	738	12,837
TAs	1093	677	27	65	--	137	1999
As % of total	12.6%	36.7%	8.1%	5.9%	--	18.6%	15.6%
RAs	1358	351	--	15	--	12	1736
As % of total	15.7%	19.0%	--	1.4%	--	1.6%	13.5%
Other*	538	112	54	--	--	--	704
As % of total	6.2%	6.1%	16.2%	--	--	--	5.5%

** Includes staff associates, fellowships, trainees at UW/WSU; staff assistants at CWU.*

Cost-Benefit to State -- TAs represent a cost savings to the institution and state. One TA typically teaches the equivalent of one-half to two-thirds of one full-time faculty person, at a cost of $10,000 to $15,000 (stipend + tuition waiver, resident and non-resident rates, respectively) compared to $30,000-$40,000 in salary for one faculty person. No savings, of course, are worth the cost if quality instruction is not provided. But if TAs can deliver good instruction to undergraduates and hone their professional skills at the same time, the investment is a good one.

RA positions are predominantly funded from federal and other non-state grants. RAs assist faculty to acquire and perform research which brings millions of dollars of non-state revenue into the state, creating secondary and tertiary employment and benefits far outside the research lab. Tuition fees are normally built into grant budgets. This is done for two reasons: first, because some funding agencies expect institutions to waive tuition for graduate students receiving stipend support from the agency, and second, because stipend levels are not sufficient for students to pay tuition from their stipends.

Stipend Levels and the Cost of Living -- That last statement requires some explanation. TA and RA stipend levels at the public institutions have not kept pace with the cost-of-living increases experienced by some of the communities within which universities are located. For example, Table 20 provides a profile of stipend levels by institution, which must cover 9 months -- and sometimes 12 months -- of rent, food, and utilities payments.

Table 20
1989-90 Academic Year Stipend Rates by Institution

	TA Stipend		RA Stipend	
	Pre-Master's	Post-Master's	Pre-Master's	Post-Master's
UW	$7974	$9216	Variable	Variable
WSU*	$7542	$8028	$7290	$7794
CWU	$4936	–	$4936	
EWU	$4974	–	$4974	
WWU	$6771	–	Variable	

NOTES: Variable rates are determined by competitive levels and the availability of external funds to a department.
** WSU 1990-91 RA stipend level has been made the same as TA rates.*

Cost-of-living differences affect graduate students in varying degrees. There are clear differences along rural/urban lines, but also between paying tuition or receiving a tuition waiver. Obviously, stipend levels which assume support of a single student cannot adequately support married students or students with children. Given the higher cost-of-living and changing demographics of graduate students, stipend amounts will become more problematic, not less so.

In comparison to the average of their peer institutions, UW TA stipend levels are lower and RA stipend levels higher than the average; WSU stipend levels for both TAs and RAs are higher than their peer average (UW, 1989; Burkett & Smith, 1989). The UW has attempted to vary RA stipend levels by allowing departments with external funds to enhance the stipend level if they choose to do so; some departments have not done this for fear of creating animosity between lower-paid TAs and higher-paid RAs. One comprehensive institution has increased stipends for TAs by allocating a fraction of a percent of the appropriated faculty salary increase to TA salaries.

TA/RAs provide a service to the institution and state that is not, at present, adequately compensated, if one looks at the stipend level alone. This is one reason, among others, that retaining the tuition waiver is important for this population. It is also essential that graduate students receive compensation that allows them to live -- not extravagantly but adequately -- within their communities. This will mean that there will continue to be differences in stipend levels among institutions, and that institutions should make certain that graduate students are adequately considered in allocating state salary funds.

Student Welfare -- One issue which affects TA/RAs and many other graduate students is the decline felt in their financial situation. Many students have experienced

increasing tuition, steady stipend levels, and fewer opportunities to work as TAs and RAs. They must purchase health insurance, support families, pay rents that go up with the cost-of-living in the community, and take out loans that will take 10 to 20 years to repay. They work long hours preparing to teach classes and preparing their own papers for the courses they take. One phenomenon seen on many campuses is the increased organization of graduate students to pursue common goals and welfare issues (Blum, 1990). The problem of worsening graduate student welfare is a complex one, one requiring both additional state resources and institutional commitment to help graduate students perform their duties with dignity and appropriate support.

Financial Aid

Financial aid has been made available to those graduate students who apply and have unmet financial need. As has been discussed earlier, the perception is that graduate students do not meet standard definitions of financial need which is not entirely accurate. Financial aid, when awarded, looks very different for graduate students when compared to undergraduates. Graduate students are less likely to receive financial support that does not need to be paid back (i.e., grants and work/study) and more likely to receive loans, which is clearly shown in Table 21.

Table 21
Academic Year 1989-90 Aid to Graduate Students

	Scholarships	Work/Study Funds State	Federal	2 1/2%	Loans*	Total
UW	$45,572	$295,169	$381,538	$543,686	$7,159,988	$8,425,953
WSU	$20,700	$579,948	$361,666	$106,075	$2,905,735	$3,974,124
CWU	–	$87,024	$28,814	$12,447	$312,784	$ 441,069
EWU	$4,742	$168,836	$23,512	$24,517	$456,784	$ 678,391
TESC	–	$6,848	–	–	$137,199	$ 144,047
WWU	$1,824	$157,153	–	$30,626	$397,129	$ 586,732
Independents	$59,281	$1,125,279	$274,044	–	$8,416,535	$9,875,139
TOTALS	$132,119	$2,420,257	$1,069,574	$717,351	$19,786,154	$24,125,455
% of Total $	0.6%	10.0%	4.4%	3.0%	82.0%	100%

NOTE: Known to be awarded to students with financial need. Therefore, these figures are not to be construed as complete or comprehensive.
** Federal loan programs include SEOG IY/CY, NDSL, Health Loan, Nursing Loan, HEAL/FISL/GSL.*
SOURCE: Unit Record Report (HECB).

Loans and the Debt Burden -- The concern expressed nationally about the rising debt burden of graduate students has large implications for the future. For instance, graduates with heavy loans to repay are less likely to purchase houses and they are less able to take lower-paying employment. Table 22 provides the annual borrowing limits for federally guaranteed loan programs. It is clear that a graduate student can complete his/her schooling with a substantial debt burden were he/she to borrow even one or two years from the Perkins, Stafford, or SLS/PLUS programs. This information is consistent with a 1988 survey of graduate students at the UW, where 53% of recent doctorates had less than $5,000 indebtedness, 32% had indebtedness of between $5,000 and $15,000, and 15% owed more than $15,000 (UW Graduate School, 1989).

Table 22
Maximum Annual Loan Limit for Graduate Students

Loan Program	Maximum Loan Limit
Perkins (need-based)*	$18,000 per year
Stafford (need-based)	$7,500 per year
Cumulative limit of $54,750 undergrad + grad	
SLS/PLUS (non-need-based)*	$4,000 per year
Cumulative limit of $20,000 undergrad + grad*	

*Excludes Stafford amounts.

A HECB report on the 2.5% loan fund (HECB, 1990) documented how institutional use of the fund has evolved. Institutions set aside 2.5% of their tuition and fee collections and then make long-term loans to students who have accumulated excessive loan burdens. However, the 1983 legislature allowed funds to be used by institutions to support students in a variety of ways, including short-term loans and grants of the repaid dollars to a second student. Approximately 9,000 students have received 2.5% monies, but apart from the Unit Record Report which documents aid given to students deemed to have financial need (see Table 21), no accounting of whether these were graduate students is possible.

One recommendation which has been proposed by the National Association of State Financial Aid Administrators (NASFAA) is a loan repayment process whereby employers repay student loans as a part of an employee's benefit package. An example of such a program was proposed for federal employees. This is an idea with some merit, which should be discussed at greater length with Washington State employers.

Grants/Fellowships -- While loans and grants may appear to provide the same level of support from the state's point of view, they do not have the same effect on the student.

Grants reduce the cost of education to the student while loans, especially by the time they are paid back with interest, have increased the cost of education (Frances, 1990). Clearly, the institutions and the state should attempt to increase the amount of scholarship and fellowship monies available to graduate students. These grant-type programs can and have been funded by institutions' development campaigns, federal and private foundation support, and corporate giving.

The **Washington State Graduate Fellowship Program** has been a successful way to fund fellowships for distinguished graduate students. A HECB (1991) status report details how the $1,500,000 appropriation from the 1990 Legislature has been matched to fund 60 fellowships at $25,000 each. The Graduate Fellowship Trust Fund Program (RCW 28B.10.880 through .887) allocated fellowships as appears in Table 23.

Table 23
Graduate Fellowship Trust Fund, FY 1990 Appropriations

1990-91	Allocated Fellowships
UW	36
WSU	18
CWU*	2
EWU	1
TESC	1
WWU*	2

** Six fellowships were to be divided equally among the comprehensive institutions. CWU and WWU were recipients of the two remaining allocations as a result of a drawing held by the HECB.*

Over 80% of the fellowships have been matched by private or internal sources, which is an excellent record of fund raising in a short period. The program has two important advantages. First, funding a fellowship is a one-time investment which supports graduate students in perpetuity. Second, state resources are leveraged to increase private funding of higher education in a manner that creates a permanent legacy for graduate students in years to come.

Additional funding would be a permanent investment in graduate student fellowships. A $3 million appropriation by the Legislature per biennium would allow the state's universities to match these funds to create 120 new fellowships allocated to the doctoral and comprehensive institutions as suggested in Table 24. If matching funds cannot be raised in a year's time, the unmatched funds could be freed to another institution. Fellowships should be flexibly allocated, but suggested uses might be to enhance minority recruitment, support disciplines which are poorly funded by external agencies, or recruit and retain highly qualified students to Washington institutions.

Table 24
Proposed Appropriation to Graduate Fellowship Program, per Biennium

Institution	Allocated Fellowships	Dollars
UW	72	$1,800,000
WSU	36	$ 900,000
CWU	3	$ 75,000
EWU	3	$ 75,000
TESC	3	$ 75,000
WWU	3	$ 75,000
TOTALS	120	$3,000,000

Funding for the **Minority Graduate Fellowship Program** should enable the HECB to assist able minority students to pursue master's or doctoral degrees within the state of Washington. The program is designed to increase the number of minority graduate students who go on to teach in a community college or 4-year institution. Approximately $1.2 million appropriated per biennium could support 14 students from underrepresented populations as they pursue a master's degree (maximum support of two years) or a doctoral degree (maximum support of four years).

At present, the **State Need Grant** program allocates monies from increased tuition rates to financial aid for needy undergraduate students. Graduate students have been excluded from receiving assistance from this program, even though they are eligible for aid in statute (RCW 28B.10.800 through .824). Allowing graduate students to receive these funds without increasing the total funds available to the State Need Grant program would unfortunately decrease the number and level of awards to needy undergraduate students. Additional funding of the State Need Grant program would be a boon to many needy graduate students, but it should be done so as not to lower funding to assist undergraduate students.

Cost of Graduate Enrollment Plan

The cost to the state of this graduate enrollment plan was incorporated into the cost of increased enrollments from Design for the 21st Century (HECB, 1990). The cost of adding faculty and providing other necessary instructional support to handle enrollment growth is assumed to be covered by full-FTE funding of the increased enrollments, as was recommended in a prior section of this report. The total cost to the state of increased graduate enrollments to reach the 70th percentile appears in Table 25.

Table 25

Incremental Net Cost to General Fund
of Increased Graduate Enrollments ($ in Thousands)
Constant 1991 Dollars: 1993 to 2010

	Incremental Biennial Totals			Cumulative Annual Totals		
Institution	93-95	95-97	97-99	2000	2005	2010
UW Seattle	2128.2	2067.8	2007.4	7207.1	12,225.2	17,243.5
Evening	814.4	814.4	814.4	2850.4	4275.3	5293.2
Bothell	428.6	642.9	857.2	2357.3	3321.5	3857.2
Tacoma	509.1	594.0	678.8	2121.4	3097.3	3733.7
TOTAL UW	*3880.2*	*4118.9*	*4357.6*	*14,535.5*	*22,919.3*	30,127.7
WSU Pullman	3692.6	3038.4	2384.2	10,307.3	14,479.7	17,460.0
Southwest	332.8	287.4	242.0	983.2	1709.7	2314.9
Tri-Cities	294.6	212.8	131.0	703.9	1195.0	1686.1
Spokane	959.3	790.1	602.0	2652.4	4157.0	5661.8
TOTAL WSU	*5279.4*	*4328.7*	*3359.2*	*14,626.9*	*21,541.4*	27,122.7
CWU	333.4	236.9	140.4	780.9	1377.7	1904.3
EWU	563.2	644.9	426.6	2298.0	3569.8	4478.1
TESC	355.8	449.4	533.6	1610.3	2256.1	2630.5
WWU	798.4	591.7	375.6	1953.5	2376.3	2845.9
Post-Bacc	178.0	178.0	178.0	623.0	1067.9	1512.8
INST'L COST	11,388.4	10,548.5	9371.0	36,448.1	55,108.5	70,622.0
Financial Aid	282.8	268.8	253.8	932.5	1419.8	1825.6
STATE COST	11,671.3	10,817.3	9924.9	37,380.8	56,528.3	72,447.6

NOTES: (1) Total costs at each institution have been reduced by tuition revenues to arrive at a net institutional cost:

REVENUE	*1246.9*	*1185.0*	*1119.1*	*4111.3*	*6260.2*	*8049.2*

(2) FTE conversion from headcount was based upon the actual relationship between Fall headcount enrollment and annual average FTE. (3) Cost per FTE for the main campuses = Grad I and II costs in the 1989-90 Educational Cost Study, plus the FY 91 percent budget increase. (4) Cost per FTE for the branch campuses = budgeted cost per FTE, excluding start-up costs. (5) Cost per FTE for post-baccalaureates = the weighted average of upper-division costs and Grad I costs, assuming an equal split between upper-division and graduate enrollments. (6) State Need Grant Cost = 24% from tuition revenue generated from increased enrollments minus 5.5% for Pell Grants. (7) Tuition Revenues = (1991 operating fee for resident graduate students) x FTE waivers, with percent waivers based upon the actual March 1991 OFM Tuition and Fee Model.

The special case of adding new faculty in the sciences and technical fields deserves mention. Universities are finding the start-up costs of new faculty -- setting up the lab, buying equipment, supporting research until external funding is won -- runs between $100,000 to $250,000, and can go higher in specialized fields. These facility and equipment costs are not incorporated into the estimates in Table 25.

Other costs which support graduate students but may not be fully represented in the per-FTE cost estimates in Table 25 are libraries and labs. Graduate students make greater use of libraries than undergraduates, both in the depth of the research information that they need but also the breadth. Faculty involved in graduate education also make demands upon the library at a time when libraries are experiencing incredible increased costs. For example, the cost of some technical and research publications has climbed 100% to 200% and many libraries must now choose which journals to discontinue. The cost of new information technology is substantial, even though such technology should eventually make library materials more accessible and should be the means for imaginative cost-cutting measures (e.g., electronic journals). Increasing graduate enrollments will make ever greater demands on libraries, and state support for added personnel, materials, and technology should be incorporated into future institutional budget requests.

Graduate students and their faculty mentors use laboratories and scientific equipment in their research projects and in their graduate coursework. Extensive expansion of some graduate programs will require a careful look at whether there are sufficient instructional and research laboratories, appropriate equipment, and disposable materials. Other requirements for capital space -- offices for new faculty and graduate students -- will need to be assessed on a program-by-program basis in light of each institution's long-range plans for graduate programs, existing space and equipment available, and the number of additional graduate students proposed. The total enrollment levels proposed in Table 11 assume the need for additional capacity at many of the main campuses. Therefore, the HECB and the institutions should immediately initiate planning for appropriate capital expansion. The enrollments at the branch campuses are assumed to be at their maximum, and assume no additional growth in undergraduate students beyond the Board's 1990 enrollment plan, for campuses where plans for capital construction have been finalized (e.g., WSU Tri-Cities).

Table 26

Total State Expenditures for Graduate Education Plan ($ In Thousands)

	Biennial Totals		
	93-95	95-97	97-99
Net Cost of Enrollment Growth	11,671.3	10,817.3	9924.9
Graduate Fellowship Program	3,000.0	3,000.0	3,000.0
Minority Graduate Fellowship	1,020.0	1,100.9	1,320.4
TOTAL COST	15,691.3	14,918.2	14,245.3

What Institutions Can Do

The challenge of increasing graduate enrollments is clearly one which will require additional state resources. However, institutions can also make important contributions to increasing enrollments, improving the graduate experience, and spending state resources wisely and well. Several of these suggestions have been discussed earlier, and are reviewed briefly here.

Retention and Time-to-Degree -- Drop outs and students who take many years to complete a degree are increasingly a productivity problem. Nationally, drop outs represent a loss (to the state and individual) and students who linger in their educational programs may also be filling an enrollment position from which other students could derive benefit. Several factors impact the ability of students to complete their degrees. One has been increased dependence on part-time employment, which more attention to adequate student support should help alleviate. Increased state support should see benefits in increased productivity of graduate schools, as more students complete their degrees, and sooner, which should allow graduate programs to accommodate more students over the long term. However, the national averages of 7 to 10 years to complete a doctoral degree are also affected by institutional practices, which should be identified and remedied. The pressures on graduate education to improve its productivity will only increase as the national and state need for doctorally-trained individuals increases in response to growing faculty retirements.

Faculty Productivity -- Faculty productivity has been characterized as a contact hour issue. However, the components contributing to faculty productivity are much more complex, as is the relationship of faculty productivity to quality. For example, increasing the number of students in a class appears to increase faculty productivity but at the same time decreases the amount of time in class -- and out of class -- a professor can devote to each student's needs and questions. In graduate education, it is often out-of-class faculty contact -- i.e., advising, thesis assistance, work on joint articles -- which is the great boon (to students' education) and demand (on faculty time). In the graduate enterprise, increasing instructional time may also impinge on time devoted to research, when research projects contribute valuable experience to graduate students. Despite all of these caveats, individual faculty members and institutions can improve productivity through a judicious use of time and reward structure which emphasizes time spent with students.

Supportive Environments and Student-Centered Advising -- One factor which has surfaced in research on retention, and especially minority retention, is the importance of a supportive environment for all graduate students. "Support" means a variety of things, from financial support to inclusion in departmental functions. Faculty advising and mentorship are crucial; They are especially important to students who might -- for whatever reason -- feel like outsiders in the graduate program. Students should feel that their educational needs are the highest priority to the faculty and department. All levels of university administration -- from deans to chairs to faculty -- must be consistent in applying rules, treat students equitably, and provide adequate academic advising.

Support can be small acts of personal interest or organized activities to encourage attachment to the department, its goals, and members. Support may require capital projects -- such as making sure that sufficient affordable housing is available -- or extending the health benefits of employees to the GSA. What is perceived to be support is very individual, crucial to persisting to graduation, and primarily within the purview of the institution and its faculty to create.

Fund Raising and Grantsmanship -- Several suggestions throughout this document have stressed the responsibility of institutions to raise funds from external sources through grants, contracts, or development activities. It is clear that the institutions and the state must share a fiscal responsibility to graduate education; the state should concentrate on funding some items and institutions be held responsible for others. As an example of the first, increased state funding of the Graduate Fellowship Program would be a permanent enhancement to graduate education; matching state appropriations with private funds would be an example of the second.

Internal Reallocations -- Institutions should be held responsible for managing their resources capably. Internal reallocations should occur when enrollment patterns change, institutional priorities are modified, or state or community needs evolve to make different demands on the institution. Institutions should make every effort to improve efficiency and to take the opportunity to leverage internal resources for increased external support. This requires ongoing review of the quality and effectiveness of existing graduate programs.

Clearly, the responsibility for creating and maintaining a quality graduate education enterprise in the state of Washington will be shared between the state and its institutions. While funding for higher education improvements will always be a challenge, it is still possible to accomplish a great deal through creative and thoughtful changes.

What financial policies will be needed to encourage graduate enrollment growth and maintain program quality?

Summary

- It is possible to maximize the impact of state resources by tailoring graduate student support to meet the different needs of different disciplines, master's or doctoral track programs, recruitment demands, campus locations, missions, and financial needs of students.
- Resident students will increase their participation in graduate education through a variety of means: increased enrollments at main campuses, branch campuses, and off-campus programs.
- Non-resident students (out-of-state and international) make an important contribution to the quality of graduate education.
- Resident and non-resident graduate tuition has climbed to levels which are higher than the average of the institutions' peer groups; this is seen by some as a barrier to reaching the 70th percentile enrollment goal.
- The institutions and the HECB will attempt to document the effect of the state's high graduate tuition.
- Summer tuition is not higher than the rate for an equivalent load during the academic year. In many cases, it is set at a lower rate.
- TAs provide a cost-benefit to the state as they serve in apprentice positions to the faculty. Only 15.6% of all graduate students in 1989 were TAs.

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What financial policies will be needed to encourage graduate enrollment growth and maintain program quality?

Recommendations

- The state institutions, in consultation with the HECB, should initiate planning for provision of health care benefits, child care, and housing for graduate students.
- Part-time tuition should be set assuming 10 credits comprise a full load.
- The waiver for GSAs must continue and should be reconceptualized as an important element of their compensation package.
- The public universities should consider allocating use of the 4% waiver monies to graduate students more broadly than is currently the case.
- The state should continue to fund the Washington State Graduate Fellowship Program at the rate of $3 million per biennium, to establish 120 permanent fellowships at the public institutions.
- The state should establish and fund the Minority Graduate Fellowship Program, to increase the number of minority faculty to teach in community colleges and 4-year institutions.
- The State Need Grant Program should be expanded to include needy graduate students, who may then choose the graduate program they desire at either a public or private university.
- The HECB, in consultation with the institutions, should initiate planning for additional capital capacity to handle graduate enrollment growth at the main campuses.
- Institutions should implement ways to improve student retention, decrease time-to-degree, enhance faculty productivity, create supportive environments, and raise external funds or reallocate internal funds to support many improvements.

AFTERWORD

The Graduate Education Study has focused nearly exclusively on graduate students, degree programs, and the needs of Washington State. It is important, at this closing moment of the study, to step back and look once again at the larger picture, one which includes graduate education but does not involve itself solely with its concerns.

The health and future vitality of the graduate enterprise in the state of Washington requires the renewed efforts of several groups of individuals, not least of which are the teachers in the K-12 system who stir the curiosity and equip the young minds of future graduate students. Certainly, K-12 and undergraduate education must work, and must work well, so that graduate education may make its contributions to the state and nation.

Students must be willing to undertake demanding and disciplined study, to think critically and creatively, and enjoy the pursuit of new knowledge in its many forms. Future graduate students must arrive at their studies with able minds and considerable knowledge so that they may progress beyond today's accepted truths. Among the concerns that worry planners for graduate enrollment growth is the educational pipeline. Will the students be prepared for graduate study? Will they desire to pursue it? What do all of us need to do to ensure that students continue in their studies, take the difficult coursework, enroll in math and science, and succeed at each stage?

The public has a right to expect that graduate education can make a great contribution to the state. However, the success of the graduate enterprise will depend upon the assistance of K-12 teachers and students, community college and undergraduate faculty, university and college administrators, and the Legislature of the state of Washington.

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B. Master's Degrees for Teachers: A Study of Supply and Demand

C. Spokane Subcommittee Report and Recommendations

D. Financial Subcommittee Report and Recommendations

APPENDIX A

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APPENDIX B

HEADCOUNT ENROLLMENT GROWTH
Graduate and Professional Enrollment Plan
(Adopted by HECB April, 1990)

	1990	1995	2000	2005	2010
Independent Institutions	6950	7750	8550	9340	10,000
Public Institutions (Excludes sites below)	15,150	16,230	17,340	19,210	20,730
UW Bothell	0	500	700	800	800
UW Tacoma	0	500	700	800	1000
WSU Southwest	170	300	500	750	1000
WSU Tri-Cities	360	400	440	480	500
WSU Spokane	100	300	450	650	1000
UW Evening	0	400	700	1200	1500
Total Branches	630	2400	3490	4680	5800
EWU Spokane Center	600	700	800	850	1000
Unallocated	0	0	0	0	2500
TOTAL	23,330	27,080	30,180	34,080	40,030
PERCENTILE	22nd	40th	50th	62nd	70th

SOURCE: Design for the 21st Century (HECB, 1990, p. D2).

STATE PLAN
University of Washington – Seattle
Graduate Enrollments by Field

	1990	1995	2000
Arts & Sciences			
Arts	336	355	375
Humanities	688	720	750
Social Sciences	855	935	1015
Sciences	831	970	1090
Professional Fields			
Business & Mgt.	501	500	500
Education	504	500	500
Public Admin. & Planning	245	245	245
Social Work	318	320	320
Library Science	176	185	195
Legal Studies	36	35	35
Architecture	209	210	210
Engineering & Tech.	1113	1170	1205
Forestry	177	185	195
Fisheries	311	320	330
Nursing	299	350	400
Allied Health	126	130	130
Public Health	302	345	385
Medicine	233	290	345
Dentistry	59	60	60
Pharm. Sci.	80	80	80
Interdisciplinary	166	205	245
Other (Unclassified)	81	80	80
First Professional			
J.D.	463	450	450
M.D.	644	645	645
D.D.S.	204	200	200
Pharm.D.	13	15	15
TOTALS	**8970**	**9,500**	**10,000**

APPENDIX C

STATE PLAN
University of Washington -- Evening Degree Program
Graduate Enrollments by Field

	1990	1995	2000
Arts & Sciences			
Social Sciences	--	65	130
Sciences	--	100	215
Professional Fields			
Business & Mgt.	--	60	105
Education	--	130	265
Social Work	--	30	60
Engineering & Tech.	--	115	225
TOTALS	**--**	**500**	**1000**

STATE PLAN
University of Washington – Branch Campuses
Graduate Enrollments by Field

BOTHELL BRANCH CAMPUS

	1990	1995	2000
Professional Fields			
Business & Mgt.	--	45	160
Education	--	60	185
Engineering & Tech.	--	45	155
Allied Health	--	50	100
BOTHELL TOTAL	--	*200*	*600*

TACOMA BRANCH CAMPUS

	1990	1995	2000
Professional Fields			
Business & Mgt.	--	80	190
Education	--	80	185
Engineering & Tech.	--	90	225
Allied Health	--	50	100
TACOMA TOTAL	--	*300*	*700*
TOTAL BRANCH CAMPUSES	--	**500**	**1300**

STATE PLAN
Washington State University -- Pullman
Graduate Enrollments by Field

	1990	1995	2000
Arts & Sciences			
Arts	36	55	65
Humanities	61	85	105
Social Sciences	374	615	715
Sciences	401	560	590
Professional Fields			
Business & Mgt.	147	230	300
Education	257	330	360
Family/Other	43	35	75
Architecture	10	15	25
Engineering & Tech.	295	360	400
Agriculture	155	165	210
Nursing	26	65	95
Allied Health	10	35	80
Pharm. Sci.	23	35	45
Vet. Sci.	67	90	105
Interdisciplinary	15	20	25
First Professional			
D.V.M.	305	305	305
TOTALS	2225	3000	3500

STATE PLAN
Washington State University -- Southwest Washington
Graduate Enrollments by Field

	1990	1995	2000
Arts & Sciences			
Humanities	--	20	20
Social Sciences	--	30	30
Sciences	0	20	60
Professional Fields			
Business & Mgt.	30	50	75
Education	58	195	290
Architecture	--	15	15
Engineering & Tech.	21	70	90
Nursing	--	--	20
Unclassified	15	--	--
SOUTHWEST TOTALS	124	400	600

STATE PLAN
Washington State University -- Spokane
Graduate Enrollments by Field

	1990	1995	2000
Arts & Sciences			
Humanities	--	20	20
Social Sciences	0	30	50
Sciences	--	15	30
Professional Fields			
Business & Mgt.	--	70	115
Education	--	85	170
Public Admin. & Planning	--	15	15
Architecture	--	40	40
Engineering & Tech.	27	65	90
Allied Health	44	60	70
Unclassified	10	--	--
SPOKANE TOTALS	81	400	600

STATE PLAN
Washington State University -- Tri-Cities
Graduate Enrollments by Field

	1990	1995	2000
Arts & Sciences			
Humanities	--	15	15
Social Sciences	--	30	30
Sciences	73	145	160
Professional Fields			
Business & Mgt.	19	40	60
Education	150	270	270
Engineering & Tech.	88	100	150
Nursing	--	--	15
Unclassified	47	--	--
TRI-CITIES TOTALS	377	600	700

STATE PLAN
Central Washington University
Graduate Enrollments by Field

	1990	1995	2000
Arts & Sciences			
Arts	33	50	60
Humanities	31	45	60
Social Sciences	51	70	80
Sciences	32	70	100
Professional Fields			
Business & Mgt.	25	25	25
Education	169	300	330
Public Admin. & Planning	14	20	20
Family/Other	9	20	25
TOTALS	364	600	700

STATE PLAN
Eastern Washington University
Graduate Enrollments by Field

	1990	1995	2000
Arts & Sciences			
Arts	14	30	45
Humanities	67	100	120
Social Sciences	95	120	200
Sciences	98	150	230
Professional Fields			
Business & Mgt.	48	110	160
Education	620	740	930
Public Adm. & Plan.	61	70	75
Social Work	136	140	150
Nursing	18	30	50
Allied Health	17	70	90
Interdisciplinary	38	40	50
TOTALS	1212	1600	2100

STATE PLAN
The Evergreen State College
Graduate Enrollments by Field

	1990	1995	2000
Arts & Sciences			
Sciences	60	95	110
Professional Fields			
Education	45	125	180
Public Adm. & Planning	97	100	160
Interdisciplinary	--	--	50
TOTALS	202	320	500

STATE PLAN
Western Washington University
Graduate Enrollments by Field

	1990	1995	2000
Arts & Sciences			
Arts	26	30	45
Humanities	41	65	90
Social Sciences	125	180	220
Sciences	110	185	240
Professional Fields			
Business & Mgt.	74	120	150
Education	131	355	390
Allied Health	65	65	65
TOTALS	572	1000	1200

STEVEN T. SEWARD
Chair

ANN DALEY
Executive Director

STATE OF WASHINGTON
HIGHER EDUCATION COORDINATING BOARD
917 Lakeridge Way, GV-11 • Olympia, Washington 98504 • (206) 753-2210 • (FAX 753-1784)

RESOLUTION NO. 91-21

WHEREAS, The Higher Education Coordinating Board requested a study of graduate education in Washington State to be undertaken at its April 1990 meeting; and

WHEREAS, Graduate education provides several benefits to Washington State, as individuals with graduate degrees make contributions to business, government, and education through increased productivity and creativity; and

WHEREAS, The study involved the active participation of public and independent institutions, community and business representatives, state agency staff and graduate students; and

WHEREAS, The public and independent institutions prepared institutional projections for graduate enrollment growth from 1990 to 2010; and

WHEREAS, The study has outlined policy recommendations which are intended to facilitate an implementation of the Board's enrollment goal for graduate education and which will be reviewed as part of the update to the Master Plan; and

WHEREAS, The State Plans for graduate enrollment growth by institution and by field contained within the study provide a reasonable blueprint for growth;

THEREFORE, BE IT RESOLVED, That The Higher Education Coordinating Board adopts the Graduate Education Study to encourage the participation of more Washington residents in graduate education and to ensure the benefits thereof to be more equitably available to students. Revisions to the Study may be made as the Board reviews existing policies within the context of the update of the Master Plan or other Board policy discussions.

Adopted:
September 25, 1991

Attest:

Steven T. Seward, Chair

Mary C. James, Secretary